and Mn_2Cl_6 in various ways on pigeons intoxicated with venom of *Crotalus terrificus, Lachesis jararaca,* and Indian cobra, and he thinks some of them, particularly sparteine and adrenalin, might be useful as complements to serotherapy.

Antivenoms.—G. C. MAITRA & M. L. AHUJA[5] having at their disposal some long-stored "time-expired" Kasauli anticobra-daboia serum, which is commonly supposed to keep good for a year and in a plus 25 per cent. dosage for the following year also, carefully tested its power on series of 300 gm. pigeons, injecting 2 cc. of an incubated mixture of venom and the antiserum into the breast muscles, and discovered that it, like antidiphtheria serum, retains its specific power very much longer than has been supposed. The tests in every case were controlled. The following are the results of their experiments :—

Age of serum.	Number of samples.	Neutralizing power of 1 cc. of serum in 1 mgm. cobra venom.	Percentage loss of power during storage.	Percentage retention of power after storage.
2½ years	1	0·5	Nil.	100
3 years	2	0·2	60	40
3½ years	1	0·5	Nil.	100
4 years	1	0·3	40	60
7 years	4	0·5	Nil.	100
7½ years	3	0·5	Nil.	100
8 years	1	0·4	20	80
8½ years	4	0·28	45	55
9 years	2	0·35	30	70

The authors note the earlier discovery, by ANDERSON & CAIUS, of a loss of power in Kasauli antiserum in the course of six to eight months, and of an enhancement above its original power after twelve to fourteen months' storage.

Laboratory Observations and Experiments on Snake Venom.—CHOPRA & ISWARIAH[6] state with regard to cobra (*Naja tripudians*) venom that the rise of blood-pressure is associated with stimulation of the vasomotor centre and is *not* due to acceleration of the heart ; and they confirm the accepted opinion that the main action of the venom in lethal and sublethal doses is an initial stimulation and a final paralysis of the respiratory centre, *not* of the motor end-plates in the respiratory muscles. CHOPRA & CHOWHAN[7] find, contrary to a statement that has been made, that cobra venom is fatal to several types of Protozoa.

[5] MAITRA (G. C.) & AHUJA (M. L.). Potency of Time-Expired Antivenomous Serum stocked under Ordinary Conditions of Storage at the Central Research Institute, Kasauli.—*Indian Jl. Med. Res.* 1931. July. Vol. 19. No. 1. pp. 155–158. [2 refs.] [Central Research Inst., Kasauli.]

[6] CHOPRA (R. N.) & ISWARIAH (V.). An Experimental Investigation into the Action of the Venom of the Indian Cobra—*Naia naia vel tripudians.*—*Indian Jl. Med. Res.* 1931. Apr. Vol. 18. No. 4. pp. 1113–1125. With 3 graphs. [8 refs.] [School of Trop. Med. & Hyg., Calcutta.]

[7] CHOPRA (R. N.) & CHOWHAN (J. S.). The Action of the Venom of the Indian Cobra (*N. naia vel tripudians*) on Certain Protozoa.—*Indian Jl. Med. Res.* 1931. Apr. Vol. 18. No. 4. pp. 1103–1111. With 2 coloured plates. [5 refs.] [School of Trop. Med. & Hyg., Calcutta.]

In strong solutions *Paramoecium caudatum* is at once paralyzed, sinks, swells, bursts, and disappears; even in solutions of 1 in 30,000 it kills *P. caudatum* by paralysis after exposure of 1 or 2 hours.

Malcolm Smith & Hindle[8] found the minimum lethal dose (for mice) of the venom of the pit-vipers *Trimeresurus sumatranus* and of *T. wagleri* to be 0·5 mgm. and 2·45 mgm. per kilo of body-weight, respectively; and of the seasnake *Laticauda colubrina* (captive and without food for at least 6 weeks) to be 0·113 mgm.; they doubt that the total yield of venom from any of these three species is sufficient to render the bite dangerous to healthy adult persons. Intense and extensive congestion (p.m.) characterized the bite of *T. sumatranus*; symptoms suggesting the existence of a neurotoxin that of *T. wagleri*. These same two authors tested the venom of an Australian Black Snake (*Pseudechis porphyriacus*) that had been collected and dried 39 years ago and kept ever since at room-temperature and not protected from light, and they found that its virulence was not perceptibly lessened.

Grasset & Zoutendyk[9] remarking on the well-known powers of resistance of certain reptiles, particularly snakes, to snake venom, give the bare results of some of their experiments on this subject, using lizards, chameleons, tortoises, and crocodiles and solutions of dried venom of *Bitis arietans* and of *Naja flava*. As an illustration of its interesting quality the following selection of facts may be quoted: The mortal dose in 24 hours being found to be of venom of *B. arietans* 0·2 mgm., and of venom of *N. flava* 0·08 mgm., per 100 gm. of guineapig, the crocodile was found to be about equally sensitive with the guineapig to both species of venom; the angulate tortoise to be 15 times more resistant to the viper venom but twice more *sensitive* to the cobra venom than the guineapig; and the zonurus lizard to be 30 times more resistant to the viper venom and 15 times more resistant to the cobra venom than the guineapig.

Serology, physiology, etc.—Vellard & Vianna[10] discuss in great detail the effects on the living blood (of dog) of the venom of *Lachesis atrox*. They find that after subcutaneous or intramuscular injection there is an initial incoagulability due to rapid destruction of fibrinogen (and of complement) by the proteases of the venom; subsequently there is absence of formation of thrombin due to action of the venom on the hepatic cells, and haemolysins also are increased. The practical point here is that it is useless to use coagulant substances in treating the bite since fibrinogen is early destroyed. After intravenous injection there is at first intravenous clotting and then, in about five minutes the blood becomes incoagulable and the other events follow as above.

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8 Smith (Malcolm) & Hindle (Edward). Experiments with the Venom of *Laticauda, Pseudechis* and *Trimeresurus* Species.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Aug. 8. Vol. 25. No. 2. pp. 115–120. [4 refs.] [Wellcome Bureau of Scientific Research, London.]

9 Grasset (E.) & Zoutendyk (A.). Sur la susceptibilité des reptiles Sud-Africains aux venins de Vipéridés et Colubridés. [On the Susceptibility of S. African Reptiles to Viperid and Colubrid Venom.]—*C.R. Soc. Biol.* 1931. July 16. Vol. 107. No. 23. pp. 1082–1083. [Inst. of Med. Research of S. Africa, Johannesburg.]

10 Vellard (J.) & Vianna (Miguelote). Modificações sanguineas provocadas "in vivo" pelo veneno de *Lachesis atrox* (Linn.). [Modifications caused in the Blood *in vivo* by Venom of *Lachesis atrox* Linn.].—*Rev. Med. Cirurg. do Brasil.* 1931. May. Vol. 39. No. 5. pp. 143–169. With 14 graphs. French summary.

The same two authors[11] have also worked together on the action of snake-venoms on the complement. They show that venoms of certain Crotalines—Crotalus—have no action on the complement, while those of others—Lachesis, Trimeresurus—are anticomplimentary, and that of the Indian cobra has less and slower anticomplimentary action than the two latter; that a certain incubation-time precedes anticomplementary action; and that venom is not altered or modified in any of its activities by contact with the complement.

In his interesting Mathison Lectures KELLAWAY[12] adds to the evidence that active immunity against snake-venoms is often not so exclusively specific as was once supposed, the high resistance of animals immunized to one species of venom to other allied species of venom being due to the similarity of the venoms in toxic constitution and to the close serological relations of the snakes. These lectures should be read by those interested in immunity. This author thinks that the most important factor in the immunity of snakes to their own venoms is the high resistance of the tissues of the central nervous system, another factor being the presence of protective substances in the blood-plasma.

KELLAWAY & Eleanor WILLIAMS[13] working on the serological and blood affinities of some common Australian snakes find that the precipitin test in its simple form does not serve to differentiate closely-related Colubrid genera, but that complement-fixation carried out with precipitating antisera was not inferior to agglutination-reaction in its indication of specific as well as generic affinities. SEMBON[14] has studied the blood-picture—agglutination, onset of coagulation, changes in size and shape of erythrocytes, erythrocyte resistance, and variations in reticulocytes—produced in the rabbit by venoms of *Trimeresurus gramineus* and *mucrosquamatus, Ancistrodon acutus, Naja atra,* and *Bungarus multicinctus.*

EIGENBERGER[15] gives a general conspectus of the North American rattlesnakes, *Crotalus horridus, C. adamantus,* and *C. atrox,* and of their venom and its effects. He knows the effects as a patient, since he has been bitten by the first once, and twice by the second.

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[11] VELLARD (J.) & VIANNA (M. Miguelote). Acção dos venenos ophidios sobre o complemento. [Action of Snake-Venoms on the Complement.]—*Arch. Brasileiros de Med.* 1931. Apr. & May. Vol. 21. Nos. 3 & 4. pp. 247–261; 295–305. [6 refs.] French summary.

[12] KELLAWAY (C. H.). The Mathison Lectures. Lecture I. Snake Venoms and Antitoxic Immunity. Lecture II. The Immunity of Australian Snakes to their Own Venoms.—*Med. Jl. Australia.* 1931. July 4 & 11. 18th Year. Vol. 2. Nos. 1 & 2. pp. 1–11. [30 refs.]; pp. 35–52. [27 refs.]

[13] KELLAWAY (C. H.). & WILLIAMS (F. Eleanor). The Serological and Blood Relationships of Some Common Australian Snakes.—*Australian Jl. of Experim. Biol. & Med. Sci.* 1931. June 16. Vol. 8. No. 2. pp. 123–132. [12 refs.] [Walter & Eliza Hall Inst., Melbourne.]

[14] SEMBON (S.). Ueber den Einfluss der Schlangengifte auf Blutbild, Widerstandsfähigkeit der Erythrozyten und Blutgerinnung des Kaninchens. [Effects of Snake-Venom on the Blood-Picture, Erythrocyte Resistance and Onset of Coagulation in the Guineapig.]—*Taiwan Igakkai Zasshi (Jl. Med, Assoc. Formosa).* 1931. Feb. Vol. 31. No. 2. (311). [In Japanese. German summary pp. 18–20.] [Govt. Inst. for Scientific Research, Formosa.]

[15] EIGENBERGER (Fritz). Ueber das Gift der nordamerikanischen Klapperschlangen. [The Venom of North American Rattlesnakes.]—*Med. Klin.* 1931. June 19. Vol. 27. No. 25. (1384). pp. 922–925. ["Sheboygan Clinic," Sheboygan, Wis., U.S.A.]

Otto[16] has a rather academic paper on the possibility of estimating or authenticating the presence of neutralized snake-venom or snake-antitoxin in the blood by guineapig test (intracutaneous). He has had no incontestable success in many trials, but thinks that perhaps something may come.

A. Alcock.

[16] Otto (R.). Auswertung von Schlangengiftantiseren und Nachweis von Schlangengiftantitoxinen durch den Intrakutanversuch am Meerschweinchen. [Estimation of Snake-antisera and Authentication of Snake-antitoxin by Intracutaneous Test in Guineapig.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 69. No. 5/6. pp. 368–378. [2 refs.] [Robert Koch Inst., Berlin.]

LABORATORY REPORTS.

KENYA, Colony and Protectorate of: **Medical Research Laboratory Annual Report 1929** [KAUNTZE (W. H.), Deputy Director of Laboratory Services].—*Kenya Med. Dept. Ann. Rep. 1929.* 30 pp.

The two items of outstanding importance during the year were the advisory visit of Colonel S. P. JAMES with regard to the control of malaria, and the beginning of the building of the new laboratory. A certain increase in the number of cases of human trypanosomiasis diagnosed in parts of S. Kavirondo was investigated; the infection is described as being comparatively non-virulent. Occasional plague outbreaks in certain areas have called for preventive inoculation. Pneumonia in Africans seems to be extraordinarily fatal, and a start has been made in classifying the local types of pneumococci isolated from patients that have died from this disease. Tuberculosis also is shown to be a very important morbid state; during the year "tuberculosis of practically every organ of the body except the pancreas" was discovered by the pathologist, leaving with him the impression "that tuberculosis in the native population approaches very closely to a septicaemia." A census of a local area that had undergone treatment for hookworm, 12 months before, showed an egg-count reduction of 50 per cent. Feeding experiments that have been in progress at the Reformatory and Prison are defined but are not yet reported. An undoubted case of rabies occurred in a dog; this and certain other scares has resulted in the equipment of an Antirabies Section of the laboratory.

Statistics of the routine work of the several departments follow in order—serology, antivariola-lymph and vaccination, pathology, bacteriology, medical zoology, biochemistry, and clinical pathology at the native hospitals of Mombasa and Nairobi—from which certain items of general interest may be noted. Among causes of death lobar pneumonia is a long way first. Malignant tumours in Africans number 51, sarcoma 21 and carcinomata 30. Leprosy bacilli were found in the nasal mucus of one of 9 suspected cases. Of Helminth infestation hookworm has precedence, and then in the following order *Taenia saginata*, whipworm, *Ascaris lumbricoides*, *Strongyloides stercoralis*, and *Schistosoma mansoni*. There has been an increase of *S. mansoni* infestation among European children around Nairobi, where the intermediation of a species of Planorbis has been discovered. The vastly predominant malaria parasite continues to be the sub-tertian. Infestation with *E. histolytica* is mentioned as being rare, and chiefly in European immigrants. Medical entomology has been concerned mainly with malaria mosquitoes and their identification and control, fleas and wild rodents in connexion with plague, and tsetse-flies in S. Kavirondo.

A list is given of papers published by members of the staff mainly in the *Kenya and East African Medical Journal* for 1929.

A. Alcock.

UGANDA PROTECTORATE. **Annual Report of the Laboratory Services Division (Medical Department) and of the Uganda Malaria Survey Unit, and Human Trypanosomiasis Research Institute, for the Year ended 31st December, 1930** [DUKE (H. Lyndhurst), MACLEOD (N. C.) and others.]—32 pp. With 4 graphs. 1931. Entebbe: Govt. Printer. [Shs. 2.]

In the routine laboratory work the obnoxious feature disclosed is the heavy incidence of malaria; at Kampala, of 1,009 blood examinations 401 were positive—*P. falciparum* in 184, *P. malariae* in 33, *P. vivax* in 16, mixture of species in 9, species not identified in 159: at the Mulago laboratory, of 7,752 examinations, 2,438 were positive—*falciparum* in 1,680, *malariae* in 213, *vivax* in 467, mixed species in 35, and unidentified in 43. In the faeces routine at Mulago of 4,577 stools examined by the Barber flotation method 2,971 contained eggs of worms, and of these 2,971 hookworm was present in 2,508, ascaris in 303, whipworm in 720, and tapeworm in 263. The Protozoa found in 463 stools examined are recorded as *E. histolytica* in 15 and flagellates in 42. At Kampala 44 tumours are recorded among the histology examinations, 14 being sarcomatous, 5 epithelioma, and 5 carcinoma.

The reports of the officers of the Uganda Malaria Survey state that the Survey in Kampala continued over 12 months. It showed that apart from natural swamps and river-valleys, the township abounds in a varied multitude of artificial and haphazard breeding-grounds prolific of Anopheles. The malaria is described as hyperendemic, and its morbidity as "appalling." Nearly 100 per cent. of native children under ten years are in a state of continuous infestation, usually without symptoms, and hence are regarded as the most sufficing local reservoir of infection. All three forms of the parasite are present, and analysis of the slides identified shows the specific prevalence to be for *P. falciparum* 51·4 per cent.; for *P. malariae* 42 per cent.; and for *P. vivax* 6·6 per cent. Of the six local species of Anopheles the only convicted carriers are *A. gambiae* (=*costalis*), *A. funestus*, and *A. theileri* (a new-reported carrier). All three intrude in houses, and of 16,357 females caught in the selected observation huts 50·7 per cent. were *gambiae*, 43·4 per cent. *funestus*, and 5·9 per cent. *theileri*—the last named being fairly common in one particular locality. All three breed in haphazard and artificial waters, *gambiae* preferring the open, *funestus* the shade, and *theileri* having a special predilection for wells and ditches.

The Malaria Survey in Jinja is recorded for 4 months during the dry season. Besides the marshes and swamps of the Nile and the lake shores, varied minor artificial excavations afford breeding accommodation for Anopheles. Of the six local species four were proved carriers, namely *A. gambiae*, *A. funestus*, *A. moucheti* (common some distance from the town), and *A. pharoensis* (not very common). The predominant house-haunter is *funestus*; other house-haunting species are *gambiae* (comparatively small numbers), *pharoensis* (in huts near their breeding-places), *moucheti* and *nili* (in huts near the Nile) and *mauritianus* (habitually; and commonly sated with human blood). Of 18,338 mosquitoes caught in houses 15,204 (83·1 per cent.) were Anopheles—59 per cent. of them being *funestus*, 27·4 per cent. *moucheti*, and 10·7 per cent. *gambiae*. Of all the carriers of malaria the species showing far the highest percentage of infection during each of the 4 months of the survey was *A. gambiae*.

In the course of a mosquito reconnaissance in the Bugishu area a

number of Anopheles (including *A. kingi* and *A. garnhami*) were taken on Mt. Elgon at heights of 6,000 and 7,000 ft.

In the Report of the Human Trypanosomiasis Institute the further continuation of studies on arsenic resistance in trypanosomes, and on the rôle of ruminants as reservoirs of *T. gambiense* is recorded. Among the other current researches those on the effect *in vitro* of human and other sera upon trypanosomes, and those on carbohydrate metabolism and nitrogenous renal excretion in cases of human trypanosomiasis are particularly mentioned, as well as various studies on superinfection, and on the factors that may influence the transmissibility of trypanosomes in man. As a notable event in the medical history of the Uganda Protectorate, the discovery of *T. rhodesiense* in man is recorded, the patient being a native from the Rogem area of the West Nile District.

A. A.

TANGANYIKA TERRITORY. **Annual Report of the Medical Laboratory, Dar es Salaam for the Year ending 31st December 1929** [BURKE-GAFFNEY (H. J. O'D.), Assistant Bacteriologist, Acting Deputy Director of Laboratory Services].—52 pp. 1931. Dar es Salaam: Govt. Printer. [2s. 6d.]

The report of general routine work does not contain anything of extraordinary interest. It is stated that demands from out-stations for laboratory examinations, particularly serological and pathological, are steadily increasing. We may take note that among the pathological material from 124 individuals there were 24 malignant tumours from Africans.

The following six special investigations are reported: (1) On the virus of vaccinia, by Dr. CLEARKIN, which has been published in full elsewhere (see *Bulletin of Hygiene*, Vol. 5, p. 36). (2) On the therapeutic effect of antimony arsanilate as studied in animals infected with *Trypanosoma brucei*. The animals for experiment were chiefly Cercopithecus monkeys. Infection was usually preceded and followed by slight loss of weight, gradually increasing in unfavourable cases. The incubation period was 4 or 5 days, becoming less towards the end of the series of experiments. The drug suspended in olive oil was given by intramuscular injection, in doses of 0·75 to 3·0 grains; serious local effects occurred in only 4 cases and all of them small feeble animals. The interval between the first injection (0·75 to 3·0 grains according to weight) and the disappearance of trypanosomes from the blood was 5 or 6 hours in all cases except one which was a particularly heavy infection. The ultimate effects of treatment were much obscured by frequency of intercurrent disease (pneumonia); but even including these fatalities the average period of freedom in 21 monkeys after an average dose of 1·3 grains was 13 days. (3) A study of the value of the COOKE-PONDER polynuclear count in the diagnosis of tropical infections was too much limited and too incomplete to justify the drawing of conclusions, but the count appeared to be reliable in bacterial infections and repeated counts were valuable in prognosis and more reliable than a differential count. (4) Some experiments on the effect of standing after aeration upon the bacterial content of soda-waters point to the necessity of keeping these waters for several days, after aeration, before

consumption. (5) Comparisons of the Kahn with the Wassermann test elicit the opinion that although there is a certain want of agreement between the two the Kahn test is a valuable adjunct to the other because of its more persistent sensitiveness. (6) The results of a further bacteriological analysis of well water cannot be summarized to any good purpose, and are to be published elsewhere.

The report from the Vaccine Lymph Institute is descriptive. Clearkin's work is referred to above. That of the Analytical Chemist deals with routine. Appended Tables show the monthly figures for malaria and rainfall, for bacteria and animal parasites and their venue, for analyses of milk, and the sum total of routine examinations. The report as a whole is well arranged and well printed and is convenient and attractive in form and size.

A. A.

WALRAVENS (P.). Rapport annuel du laboratoire de bactériologie d'Elisabethville, année 1930. [**Report of the Bacteriological Laboratory, Elizabethville, 1930.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. Mar. 31. Vol. 11. No. 1. pp. 101–126. With 3 charts.

Sleeping sickness seems to be " in notable regression " ; it exists only in places where the natives repair to the river daily ; treatment by simple tartar-emetic has been tried and found wanting. Preventive B.C.G. vaccination against tuberculosis has been done on 155 infants without any untoward effect except for 6 cases of cold abscess ; in the course of the year 8 vaccinated children died, but p.m. examination produced no evidence of tubercle infection in any. Of 1,515 Bordet-Wassermann tests 360 were positive ; mental symptoms were observed in 13 cases, but no tabes. There was a serious increase in typhoid fevers. Of 71 examinations of nasal mucus, etc., 11 disclosed the leprosy bacillus. Of 1,557 European blood smears 299, and of 1,230 adult African 168 showed malaria parasites, while 90 to 100 per cent. of African children were infected. In 32 lumbar punctures 23 revealed meningo- or pneumococcus ; the value of indiscriminate preventive vaccination in epidemics of this form of meningitis is endorsed, although the immunity imparted is not long-enduring. Of 417 faecal examinations *ad hoc* 160 showed intestinal parasites—hookworm in 127, Strongyloides in 25, Ascaris in 2, *Schistosoma mansoni* in 14, tapeworm in 2, " amoeba " and *Balantidium coli* each in 1 case. Among the bacillary dysenteries the following bacilli have been identified—Shiga, Flexner, Hiss, Strong, Castellani, metadysenteric, proteus and coli. Purulent and bacillary affections of the urinary tract are much prevalent in Katanga ; one (European) case of infestation by a nematode worm is noticed, the symptoms were acute renal pain with passage of slightly purulent and sanguinolent urine and on one occasion empty egg-shells and (twice) a larva. About 30 per cent. of a body of African students were passing eggs of *Schistosoma haematobium* in the urine, and one African passed eggs of *S. bovis*. *Physopsis africana* and a species of Planorbis are the local intermediaries. A few cases of rabies in Europeans have occurred at Kivu. Particulars are given of the native school for hospital assistants and sanitary inspectors.

A. A.

Brazzaville. Rapport sur le fonctionnement de l'Institut Pasteur de Brazzaville pendant l'année 1930 [Vaucel (M.)]. [**Work of the Brazzaville Pasteur Institute in 1930.**]—76 pp. 1931. Brazzaville: Imprimerie du Gouvernement Général de l'Afrique Equatoriale Française.

This report is strait-laced with official rigour. Of its 74 pages 45 are devoted to trypanosomiasis, much of it in statistical garb. In other directions we learn that the only malaria parasites observed were *P. vivax* and *P. falciparum*; of *vivax* nothing but young schizonts, of crescents only one case. Of Filaria, always *F. perstans* and harmless. Of intestinal parasites, the dysentery amoeba and its cysts, and *E. coli*; Trichomonas; *Balantidium coli*; *Schistosoma mansoni*; ascaris, hookworm, whipworm, and strongyloides. In 112 coprocultures 76 per cent. were positive for bacilli—44·1 per cent. of these for the Shiga bacillus, 55·9 per cent. for non-toxic organisms; of 39 Shiga cases 12 were mortal. For immunization of travellers formolized dysentery toxin (anatoxin of Dumas) was used. Tuberculosis in native children is far from rare, and preliminary experiments proved the infants to be quite tolerant of B.C.G. vaccine. Three new strains of Pneumococcus were isolated. The leprosy bacillus was found in 2 of fourteen examinations. The classical hard primary sore is a clinical rarity in syphilis—"mixed" chancres are the usual phenomenon.

Of trypanosomiasis 258 new, 674 old, and 92 suspected cases were treated during the year and 30 deaths are recorded. To give statistics of the varied treatments employed at different stages and of the results observed would necessitate the reproduction of 20 pages of the report. The drugs used were tryparsamide, 270 Fourneau, atoxyl, various arsenicals, tartar emetic, moranyl, and bismuth, separately or in combinations.

A. A.

Gold Coast. **Annual Report of the Medical Research Institute and its Branch Laboratories** [Butler (G. G.), Director].—*Gold Coast Rep. on Med. & San. Dept. for Year 1929–1930.* IX. Scientific. pp. 71–166. With 18 figs. on 7 plates, 15 charts & 3 maps.

The report begins with the work of the routine departments (12 pp.), continues with reports (75 pp.) of special investigations—relapsing fever, plague, malaria, trypanosomiasis, medical entomology, schistosomiasis, etc.—and ends with some tables of statistics (4 pp.).

Of more than 5,000 routine blood-examinations, 28 per cent. showed malaria and well over 90 per cent. of these *P. falciparum*, carriers much outnumbering sufferers, since a high immunity to the disease exists in the Gold Coast. Only one case of blackwater fever occurred, in a young Swiss subject, whose death occurred within 48 hours of attack, the post-mortem examination, made within 3 hours of death, being fully reported here.

Of 62 cases of genital infection with gonococcus 13 occurred in children of 15 years and under, including ten young girls with an average age under 7 years.

The existence of enteric fevers is well corroborated. Of dysenterics 46 cases were bacillary (mostly Flexner), 43 amoebic, and 9 due to *Schistosoma mansoni*. Of relapsing fever, 25 cases were diagnosed. In about 100 routine serological examinations no evidence of the

existence of typhus was obtained. The tubercle bacillus was found in 232 of 512 sputa from cases selected as suspicious, and in 26 post-mortem examinations. Yellow fever was not encountered, but the post-mortem observations in 2 ambiguous cases labelled toxic jaundice are recorded. Among histological examinations 31 malignant tumours were observed—17 sarcomatous and 14 carcinomatous.

About 12 per cent of stools show ova of hookworm, chiefly Necator. *Schistosoma haematobium* was present in 87 urines. It is thought that about 10 per cent. of the population served by the general hospital at Accra are sufferers from schistosomiasis.

Since a small outbreak of relapsing fever in Accra cases have occurred steadily, and the autopsies of eight are here recorded to illustrate the difficulties in clinical diagnosis from toxic jaundice. Spirochaetes were found in the lice of 11 of 18 cases examined. The Wassermann reaction was found to be of no value in diagnosis. The disease was also studied experimentally in pouched rats (Cricetomys) and in desplenated white rats. The most constant lesion in the former is enlargement of the spleen. The serum of a rat recovered from an infection with any type of spirochaete contains something that disintegrates and destroys that particular type of spirochaete, and there is some evidence of the development also of a *general* resistance besides this *particular* spirolysin. Desplenated rats suffer more severely from infection, but removal of the spleen does not prevent the development of immunity.

Of 4,433 rodents examined for plague, not one was found infected. A summary of the last instalment of Dr. BURGESS's experimental work on plague is given here, but the work will be published *in continuo* in the *Journal of Hygiene* [this *Bulletin*, Vol. 28, p. 389]. The pouched rat (*Cricetomys gambianus*) is described as a very suitable animal for plague experiment on account of its easiness to keep and its extreme susceptibility.

In a study of malaria in parturient mothers 328 placentas, with in each case a film of maternal finger-blood, showed 53 with parasites in both, and 23 in the placenta only—sometimes in "amazing" number. Further statistics show that active malaria of the placenta seems to be an important cause of premature labour, but not to affect the health of the infant. Placenta extracts have been employed in the search for a precipitin test for malaria, but without any confirmed success.

From study of the Bordet-Wassermann reaction in mother and infant and of a large number of placentas only about one tenth of the 30 per cent. of the cases giving the reaction seemed to be traceable to syphilis, and there seemed to be no evidence that yaws causes any gross changes in the placenta.

Of human trypanosomiasis 34 cases were diagnosed and 26 of them came for treatment (atoxyl, Bayer 205, and tryparsamide). Much experimental work in establishing strains of trypanosomes in animals is described, and the adhesion phenomenon is discussed.

The Veterinary interests being considered for the moment as more pressing than the human aspects of trypanosomiasis, entomological work has been concentrated on clearing the main cattle-route, from the French territory on the Haute Volta to Kumasi, of *Glossina palpalis* and *G. tachinoides*. On the eastern route "clearing has undoubtedly succeeded in controlling" these species, followed by burning, and in addition "motor transport and the gradual elimination of wild game is undoubtedly diminishing and restricting the distribution of the

G. morsitans group." The clearing of streams in the lower portion of the coast plains of the Eastern Province is said to be easy, but in the northern portion " the vegetation appears to be too extensive to warrant the expenditure at present." The little egret and various species of bee-eaters (Merops) have been seen hawking the fly as it flees from the burning bush. Observations in the laboratory showed the gestation of *G. palpalis* to range between 6 and 17 days. In the fly-belts crossing the northern part of the eastern cattle route, clearing and burning have been carried on also. Here there is much big game and *G. submorsitans* is an important species. This part of the report is very full of detail on the bionomy of the flies and with local details on the effects of clearing, burning in the early part of the dry season, maintenance of clearing, etc., and is illustrated with numerous plans and charts and some beautiful photographs.

The preliminaries of an investigation of local pondsnails in search of intermediary hosts of Schistosoma are sketched.

A. A.

MAURITIUS. **Annual Report of the Bacteriological Laboratory for the Year 1929** [BARBEAU (L. G.), Supt.].—Appendix I. 8 pp.

In the active routine of this laboratory the discovery of eggs of *Clonorchis sinensis* in the faeces of fifteen Chinamen and the number of urines found to contain eggs of *Schistosoma haematobium* led to the starting of one interesting investigation and the stimulation of another.

In the case of the Clonorchis infection it was found to exist in some instances in Chinamen who had lived in the colony without interruption for over 30 years—a fact that suggested either that some local intermediary hosts of *C. sinensis* were present in the colony or that the parasite in man was amazingly long-lived. Careful investigations showed that active miracidia did not hatch-out in water, although occasionally an inert miracidium was partly extruded from an egg; that four local species of pondsnails known to harbour cercariae of some kind did not become infected with the cercaria of *C. sinensis* when exposed to infection in water containing faeces full of the eggs of that species; and that 2 species (goldfish and top-minnows) of freshwater fishes did not become infected with the metacercaria of *C. sinensis* when living in water containing teased livers full of cercariae from the Mauritius pondsnails. Thus no clue was found in the search of the Mauritius aquatic fauna for an intermediary host of *Clonorchis sinensis*.

In the case of the *Schistosoma haematobium* infection the search for a local intermediary host among the pondsnails (already described in this *Bulletin*, Vol. 27, p. 944) was continued, but is still an enigma.

Among histopathological observations 7 cases of epithelioma, 8 of carcinoma, and 6 of sarcoma are mentioned. Shrivelled eggs of *S. haemotobium* were found in 3 epitheliomata.

The results of B.C.G. vaccination of infants are interesting in their suggestions. For all the 21,591 children born in the colony during the 18 months ending with September 1929, the death-rate from all causes was 13·12 per cent. For 1,660 of these children whose history is known subsequent to their B.C.G. vaccination the death-rate from all causes was 5·54 per cent.

A. A.

Archives de l'Institut Pasteur de Tunis. 1931. Apr. Vol. 20. No. 1. pp. 101–121.—Fonctionnement des services de l'Institut Pasteur pendant l'année 1930. [**Work of the Pasteur Institute, Tunis, 1930.**]

This is a record of a full and comprehensive routine; the original work accomplished is referred to the Journals wherein it has been published.

A full and very particular account is given of the antirabic service. During the year 1,812 persons attended for treatment and 1,345 were actually treated, 365 having the intensive treatment for bites of unusual severity. Of the 1,345 treated 1,075 were Tunisians. There were 5 deaths subsequent to completion of treatment, 3 being persons bitten by the same dog. (Intelligence was received of 3 deaths from rabies in Tunis of persons who had not come for treatment, also of the death from rabies in 1930 of a person who had undergone treatment in 1929). The sources of infection were dogs in 1,162 cases, cats in 104, rabid human beings in 28, asses and horses in 24, cattle and camels in 14, rats and mice in 8, and fox, monkey, rabbit, and weasel in one case each. The number of cases of rabies treated since the foundation of the Institute in 1906 to the present time is 19,431 with a mortality of 0·37 per cent.

During the year of this report, 1,058,346 doses of Jennerian vaccine prepared at the Institute were distributed.

In 323 analyses of dysenteric stools *Entamoeba histolytica* (or cysts) was observed in 31, *E. coli* (or cysts) in 8, Trichomonas in 23, Lamblia (or cysts) in 32, tapeworm eggs once; the Flexner bacillus in 7. In 22 spleen-punctures *Leishmania donovani* in 6 cases; and malaria parasites in 143 of 684 smears.

Of the children submitted to antituberculous (B.C.G.) vaccination during 19½ months the history of 141 has been followed. Twenty-one of them, so far, are dead, and in each case a brief statement is given of the antecedent conditions and (where known) the cause of death; among the 120 still living, many of them in contact with infected relatives, not a single unquestioned case of infection has occurred—particulars of each are given in brief.

A. A.

i. Sergent (Edmond). Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie. [**Report on the Work of the Algerian Pasteur Institute.**]—*Arch. Inst. Pasteur d'Algérie.* 1930. Mar. Vol. 8. No. 1. pp. 116–148. [51 refs.]

ii. ——. *Ibid.* 1931. Mar. Vol. 9. No. 1. pp. 141–174. With 1 plate & 1 chart. [37 refs.]

i. The research report opens with an appropriate appreciation of Laveran's memorable discovery and a retrospect of the tale of original work completed and published during the year 1929. This work includes a critical account of the value of fish against mosquitoes and a laborious examination of the basis of the facile theory of the zootropism of *Anopheles maculipennis*; much investigation of dermal and canine leishmaniasis; an inquiry on the Gram reaction and its specific limits; a report on results of B.C.G. vaccination of 3,598 children; an inquiry on the frequency and nature of the ringworms of the indigenous population; work on antirabic vaccination of dogs; and miscellaneous studies

in bird-malaria, parasitology, and entomology ; besides varied research in veterinary pathology and practice which does not come within the purview of this section.

From the service report we learn that 2,229 individuals were treated for rabies in 1929 of whom 25 did not complete treatment, and 0·2 per cent. died ; the animals answerable were dog, 1,112 ; cat, 108 ; rat, 21 ; ass, 14 ; cattle, 6 ; rabbit, 3 ; mule, 2 ; and fox, pig, sheep, goat, 1 each—besides 5 infections from rabid patients and 2 from laboratory accidents. Against malaria varied antilarval methods have been pursued extensively—oil, larvicide powders, draining and filling-in, training, clearing away of vegetation, double-channeling with alternating flow, distribution of fish. The quarters of railway officials in malarious tracts have been gauze-screened. Quinine (and other analogous medicines) has been regularly distributed by official quininers among the householders and school-children to the number of about 20,000. Several malaria surveys have been made, and instruction in prophylactic methods against malaria has been widely disseminated. Of serums, vaccines, and similar laboratory products exclusively for medical use 1,417,611 units have been issued during the year.

ii. The introduction reminds us that the scope of the Pasteur Institute of Algiers includes not only human, but also veterinary and agricultural pathology, also special instruction in pathology and in laboratory methods for colonial medical officers, and the education of the public—in short, all that bears upon the common welfare of the colony, and the physical well-being of the population. Here we confine attention mainly to matters of medical interest.

In 1930 the Institute was called upon to organize the second International Malaria Congress, and at the same time had the honour of commemorating the fiftieth anniversary of LAVERAN'S discovery of the malaria parasite, in the very hospital in Constantine where this ever-memorable discovery was made. At the village Laveran, in a certain propinquity to the imposing relics of Ancient Roman grandeur at Timgad, a modest monument to the great Frenchman was unveiled.

Among matters of research the following are noteworthy. (1) As an experiment with plasmoquine as a pivotal prophylactic of malaria 9 infected native children were kept on it for 45 days, but all were still carriers of the parasite at the end of that term. (2) Experiments *ad hoc* have shown that the parasite of Mediterranean leishmaniasis propagates in *Phlebotomus perniciosus*. (3) The work of PLANTUREUX on bacteriolysis, and his experiment describing the appearance of a bacteriolyte when a culture medium of dysentery bacilli is alkalized is briefly summarized. (4) The local ringworms and their distribution have been studied by CATANEI ; in certain localities those of natives and those of the local Europeans are found to be not due to the same fungus. (5) Experiments with animals that have become resistant to infection after clinical cure from a specific piroplasmosis show that this resistance is abrogated by splenectomy ; hence the spleen is to be regarded as " the main organ of premunition " against these infections. As research also must be included various expeditions to the Algerian Sahara to study the people and their customs and their diseases and medicine, the fauna and the parasites, and certain elements of the flora.

In 1930 the number of cases of rabies that applied for treatment was 3,936, of which 136 were certified experimentally and 1,569 clinically, and 2,231 were bites from animals suspected of rabies. Of 3,893

persons that completed treatment 5 died—4 of them more than fifteen days after conclusion of treatment. One case of neuritic complications occurred a day after conclusion of treatment, but was cured rapidly and completely. The bites were inflicted by dogs in 1,788 instances, cats in 276, equines in 15, bovines in 11, rabbits in 9, rats in 39, and jackal, fox, ferret in 5 instances. For preventive vaccination of domestic animals, enough formolized antirabic vaccine for about 2,500 dogs and a certain number of herbivora was supplied to the veterinary establishment.

The Antimalaria Service was relieved of the executive duties that it has carried on for so many years, in order to concentrate more particularly on the science of malariology.

Among the activities mentioned in a general way as having made comforting progress during the year, are treatment of infantile gastro-enteritis by massive doses of fresh cultures of lactic ferments; B.C.G. vaccination of newborn infants; "premunition" of bovines against piroplasmoses; experimental vaccination against aphthous fever by the method of Vallée, Carré and Rinjard; extension of serotherapy against porcine plague; and the preparation of the new antirabic vaccine for immunizing dogs.

A. A.

Bombay. **Report of the Haffkine Institute for the Year 1929** [Anderson (L. A. P.), Offg. Director].—69 pp. 1931. Bombay: Govt. Central Press.

Much interesting matter is contained in the annual reports of the large tropical laboratories. Most of it, no doubt, comes finally to special journals, but there are details of management and of technique which have a special call upon the attention and which are not always available in the ordinary publications.

The investigation of plague has always been the chief field for research of the Bombay laboratory. The large scale manufacture of plague vaccine has raised its own problems of preparation and distribution. How long might the vaccine he held to retain its potency and was it possible to shorten the process of manufacture so as to diminish the minimum notice required for compliance with unforeseen demands? Could agar vaccine effectively replace broth vaccine and could the reaction resulting from inoculation be lessened? These are not new problems but it is interesting to find that, as a result of the discussions of the International Plague Committee, categorical answers have been given to these questions. The Bombay broth plague vaccine may continue to be used up to 18 months from the date of manufacture and up to two years if kept in cold storage. One disadvantage of the broth vaccine was the long time taken in manufacture, but it has been found that this can be cut down from 12 weeks to 6 weeks without loss of efficiency. Another of the conclusions of the Committee was that, on the large bulk of experimental and other evidence which has accumulated, the substitution of agar vaccines for the present broth vaccine is not practicable. Plague vaccine is, unfortunately for its popularity, productive of a severe reaction and it is not thought that this can be reduced very much beyond that which follows length of storage. A very interesting research into the standardization of anti-plague vaccine, which relates both to the preparation of a fixed seed

virus and to the assessment of potency after manufacture, is referred to in some detail under the heading Antiplague Enquiry.

Tuberculosis, while not a specially tropical disease, is one of great importance in the East as in the West. Experiments on rabbits indicated that the well known BCG vaccine may exceptionally prove virulent and produce fatal tuberculosis whilst other experiments on the same animals by the Bombay workers seemed to show that prophylactic inoculation in their hands "afforded meagre protection evidenced only by prolongation of life in vaccinated animals subsequently infected with the smallest dose of virulent organism."

In the last annual report reference was made to the establishment of normal physiological standards for Indians. It has been determined that red cell counts in millions per cmm., haemoglobin in gm. per 100 cc. and volume of cells in cc. per 100 cc. were for men 5·11, 15·36 and 41·72 and for women 4·47, 12·99 and 36·27 respectively.

In the anaemia enquiry it was found that the administration of liver preparations had become so general that fully developed cases of pernicious anaemia, sprue and the severe anaemia of pregnancy were difficult to find. A reaffirmation of the statement, contained in the previous report, is made that "the resemblances between these conditions are more striking than the differences except perhaps as regards the presence or absence of free hydrochloric acid in the gastric contents." The report as a whole provides extremely interesting reading and indicates generally what a large field for experimental enquiry India affords to laboratory workers.

W. F. Harvey.

GENEESKUNDIG TIJDSCHRIFT VOOR NEDERLANDSCH-INDIË. 1931. Aug. 15. Vol. 71. No. 10. pp. 928–951. [5 refs.] Uit het Jaarverslag van het Geneeskundig Laboratorium over 1930. [**From the Annual Report of the Medical Laboratory for 1930.**]

This report contains much information about the activities of the laboratory. Some points of general interest may be mentioned.

Bacteriological Department.—On MÜLLER'S tetrathionate medium *Bact. typhosum* is often overgrown by *Proteus vulgaris*. *Bact. paratyphosum* A and *Bact. dysenteriae* do not grow on it. For these reasons it is (when used exclusively) unsuitable for laboratory practice in the tropics.

B. meningitidis Cohen was found twice. It proved to be pathogenic for monkeys (*M. cynomolgus*) who died after intracerebral infection with small doses, showing little meningeal but mostly septic symptoms. By the pharyngeal way infection experiments did not succeed. Rabbits were altogether immune.

For cultivation of the tubercle bacillus Petrof's medium was found superior to that of Löwenstein-Hohn.

Pf. whitmori was found in the body of a rat; in connexion therewith a possible human case of melioidosis is briefly mentioned. In 34 tests the Weil-Felix reaction was 8 times positive with the indologenous strain, contrary to experience in the F.M.S., where Kingsbury's anindologenous strain gives more positive results.

Malaria Department.—The important experiments in hygienic (i.e., Anopheles free) exploitation of fish ponds, already published, are briefly quoted. In the hill country where *A. maculatus* and *aconitus* are the dangerous vectors planting of shadow trees over little streams

and in ravines is suggested, since larvae of the incriminated species are never found in the jungle. In fresh water fish ponds the *Puntius javanicus* proved to be a useful larva destroyer. The entomological research mentioned is, or will be, published elsewhere.

Chemical Department.—The report deals with further attempts to standardize the strength of Vitamin B tablets issued by the Laboratory. Preparations suitable for injection could be rendered completely free from toxic substances. In serious cases of beriberi with impaired absorption from the intestine such preparations may prove useful; it should be kept in mind that daily doses are required. A definite judgment about the preparation is not yet available. A number of foodstuffs were tested chemically, and in regard to their content of vitamin A; various fish products proved negative in this respect, a brand of sweetened condensed milk positive. Difficulties were experienced in vitamin C research; the guineapigs could only gradually be accustomed to the basic diet.

Quantitative iodine tests on urine were made which will be published later.

W. J. Bais.

Clément. Fonctionnement du laboratoire de clinique de l'hôpital du Camp-Jacob de 1927 à 1930. [**Work of the Clinical Laboratory at Camp Jacob, Guadeloupe.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. Oct.–Nov.–Dec. Vol. 28. No. 4. pp. 609–611.

This short report concentrates on intestinal parasites. Of 1928 stools examined 1,649 (85·5 per cent.) contained evidence of them, the following species being represented—*Necator americanus*, 27·8 per cent.; *Ascaris lumbricoides*, 56·2; *Trichuris trichiura*, 62·7; *Schistosoma mansoni*, 20·3; *Strongyloides stercoralis*, 9·7; dysentery amoeba, 10·2; *Balantidium coli*, 0·4; flagellates, 6·0; several specimens of *Taenia saginata* were passed; eggs of thread worm were observed very often, though never found in the stools examined; a food-mite (Tyroglyphus) was found several times. A boy of 10 years, not infected with malaria parasites, but having an eosinophilia of 43 per cent. and many eggs of *Schistosoma mansoni* in his stools, on several occasions suffered from a violent rigor followed by a spell of high fever. A fatal case of balantidium dysentery occurred.

In 394 blood examinations *Plasmodium vivax* was found in 71, "*P. praecox*" in 51, and *P. malariae* in 4; and divers microfilariae in 8. In 83 examinations of sputa the tubercle bacillus was found in 22, spirilla in 4, amoebae in 4, and fungi in 1. In 9 examinations of nasal mucus the leprosy bacillus occurred in 4. In 40 examinations of chancre-juice *Treponema pallidum* was present in 5.

A. A.

Koppisch (Enrique). **Report of the Pathology Department of the School of Tropical Medicine for the Period beginning April 15, 1929 and ending June 30, 1930.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1931. Mar. Vol. 6. No. 3. pp. 334–340. [School of Trop. Med., Univ. of Porto Rico, San Juan.]

The report tells of a great increase in the number of autopsies, and of pathological specimens received from outside sources including the

neighbouring islands of Santo Domingo and St. Thomas. The incidence of tumours seems to be no different from that in countries outside the tropics; among the 1,360 miscellaneous specimens there were 347 tumours, of which 207 were malignant. The intestinal worms observed are hookworm, whipworm, Ascaris, Strongyloides, and *Schistosoma mansoni*. One case of splenomegaly was apparently caused by *S. mansoni*. Besides schistosomiasis the other tropical diseases in evidence were malaria, filariasis, sprue, and leprosy, and climatic bubo is stated to be not at all uncommon in the island. Of diseases of more general distribution lobar pneumonia was fatal in 11 cases, and lobular pneumonia in 7, and typhoid fever in 6; pulmonary tuberculosis both chronic and acute is also mentioned.

A. A.

RABIES.

A REVIEW OF RECENT ARTICLES. XVI.*

An occurrence of extraordinary interest is reported[1], [2] from Trinidad, an island in which the strictest quarantine laws against rabies are in force, and in which no case of rabies has been recognized since 1914. Cases among the human population simulating acute poliomyelitis made their appearance in 1929, and possibly earlier, mainly in children of school age. Of 20, which have occurred during the present year (1931), all have terminated fatally. Since 1925 a fatal disease diagnosed as botulism, and characterized by symptoms referable to lesions in the brain and cord has been present as an epizootic amongst cattle. The features of the human cases may be summarized as follows. The symptoms were those of paresis of limbs, bowels and bladder, loss of sensation in the limbs and abdomen. In the later stages only, the muscles of respiration and deglutition became involved. A fatal termination after an average of 8·5 days ensued. The paresis followed an ascending course. Portions of brain were submitted to HURST at the Lister Institute, London. Inoculation into monkeys induced symptoms suggestive of rabies. Subsequent subpassage through monkeys and rabbits led to the establishment of a virus which gave symptoms indistinguishable from the fixed virus of rabies. Negri bodies with " innenkörperchen " were present in the monkeys without exception, and in some of the rabbits. Similar results were obtained at the Rockefeller Institute from material supplied.

The features of the cattle disease were salivation, paresis of the legs, and a fatal termination after 5 or 6 days. A brain was sent to HURST, who reported the presence of rabies virus. PAWAN working at Trinidad found Negri bodies in one of three monkeys into which suspected material was injected. The diagnosis of botulism had been based on the clinical features of the cases and on the detection of the bacillus in the soil from the Savannah and the Government farm where cases had occurred. In two cows the bacillus was recovered from the liver and the spleen. " It appears," according to HURST and PAWAN " either that botulism and rabies exist side by side and are clinically indistinguishable or, more likely, that the cattle disease is rabies, and the finding of *B. botulinus* a chance occurrence unconnected with the real cause of death. Further investigation of this problem is proceeding as are cross immunity tests with the cattle virus and fixed virus." The latter authors discuss the unusual clinical features of the human cases, and suggest, " the possibility of a modification of the virus of rabies in a manner analogous to that of the smallpox virus in alastrim, or in an opposite direction." They found no indication from their experimental results that the Trinidad virus is either more or less virulent than the average street virus.

The epidemiological features of the human and cattle diseases, both of which may be accepted as rabies, are of peculiar interest. There

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* For the fifteenth of this series see Vol. 28, pp. 741–753.

[1] TRINIDAD AND TOBAGO. Council Paper No. 85 of 1931. Myelitis. Report on the Cases of Acute Ascending Transverse Myelitis which occurred in the Southern Part of Trinidad since 1929 [LASSALLE (C. F.).]—8 pp. With 2 folding maps. 1931. Trinidad. [Is. 4d.]

[2] HURST (E. Weston) & PAWAN (J. L.). An Outbreak of Rabies in Trinidad without History of Bites, and with the Symptoms of Acute Ascending Myelitis.—*Lancet.* 1931. Sept. 19. pp. 622–628. [51 refs.]

appears to be no geographical relationship between them. The only case in which there was history of a bite occurred on July 6th, 1931, and that was the bite of a bat. Symptoms developed on August 3rd, i.e., after 28 days. Thus 17 human beings, if they were bitten at all, were bitten without their knowledge. Reference is then made by HURST and PAWAN to an enzootic in Brazil (HAUPT and REHAAG. *Ztschr. f. Infekt. u. Hyg. d. Haust.*, 1921, Vol. 22, pp. 76, 104) in which cattle bitten by vampire bats developed rabies, and " in which the experimental investigation of a bat caught biting a cow confirmed the supposition that these creatures were the vectors." The opinion that the vector in the human and cattle cases in Trinidad, " may be the vampire bat is tentatively expressed." A typed addendum to the Trinidad Council Paper dated October 3rd, 1931, states that " Dr. PAWAN has now demonstrated Negri bodies in the brain of a bat with unusual habits."

A severe epizootic of rabies at Kindia (French Guinea), is reported by DELORME[3]. During a period of 2 months 26 persons were bitten, the biting animals being 6 dogs and 1 cat, and in addition many mad dogs were destroyed in the neighbourhood. The brains of the seven biting animals were examined, and submitted to animal test with positive results. Prior to 1927 rabies was considered to be of rare occurrence in Guinea. The marked increase which has been noted since that date is, in the author's opinion, due to the number of dogs which have been imported from Europe.

The rabies situation in Los Angeles County is causing considerable concern to the health officials. In reply to a request by the Editor of *California and Western Medicine*, MEYER[4] discusses the various methods for the control of rabies, and in a letter (page 69 of the same Journal), the County Health Officer, J. L. POMEROY, gives statistics relating to the prevalence of the disease. It appears that during the year 1930, 1,720 persons have been bitten, of whom 361 received pasteurian treatment, and that 613 rabid dogs were reported. No mention is made of fatal cases.

i. *Virus.*

Mention has frequently been made in previous reviews of epizootics in South America amongst cattle and horses, in which the symptoms were probably those of rabies. REMLINGER and BAILLY have discussed certain of these (this *Bulletin*, Vol. 28, p. 741) and have concurred in the view of the Brazilian authorities that the viruses concerned were those of rabies. TORRES[5] has applied the complement test to a number of such viruses. Antigens were prepared with the viruses of Santa Catherina, Matto Grosso (*loc. cit.*, Vol. 27, p. 262), Etat de Rio, Bahia, Espirito Santo, the Federal district, fixed virus, and normal brain substance. Sera were obtained from animals inoculated with street virus, virus of Santa Catherina, fixed virus, and from a normal animal. The method employed was that of KRAUS, TAKAKI, and MICHALKA (*loc. cit.*, Vol. 24, p. 224). The results are given in detail and show

[3] DELORME. Note sur une épizootie de rage observée à Kindia (Guinée française).—*Bull. Acad. Méd.* 1931. July 28. Year 95. 3rd Ser. Vol. 106. No. 28. pp. 103–106. [1 ref.]

[4] MEYER (Karl F.). Rabies.—*California & Western Med.* 1931. July. Vol. 35. No. 1. pp. 39–40.

[5] TORRES (Sylvio). A raiva no Brasil. Seu diagnostico pela fixação da alexina.—*Rev. Zootechnia e Vet.* 1931. Vol. 17. No. 2. pp. 148–157. [7 refs.] French summary.

that the various Brazilian viruses are identical with the fixed virus of PASTEUR. Also it was shown that the sera of rabbits inoculated with fixed virus neutralized the virus of Santa Catherina and *vice versa*.

Another South American virus has been examined by REMLINGER and BAILLY[6]. It was obtained by ROSENBUSCH from cattle during an epizootic of mal de caderas in Paraguay in 1930 (*C.R. d. l'Acad. des Sciences*, Nov. 1930). The mortality was low (20–60 per cent.) and it was stated that no Negri bodies could be found. REMLINGER and BAILLY state that when subpassaged in the rabbit the symptoms do not differ from those of rabies. The disease can also be transmitted to the guineapig, the mouse, the cat, the sheep, and the dog, the symptoms being invariably paralytic in type. Pruritus, which is the predominant symptom in infective bulbar paralysis (the pseudo-rabies of AUJESZKY), has never been observed. Negri bodies were found in the various animals inoculated. The behaviour of the virus to glycerine and ether and in dilution is similar to that of other rabies viruses. Thus the only objection to placing this virus amongst the viruses of rabies is that in cattle the disease to which it gives rise is not invariably fatal. In the case of experimentally inoculated animals, however, the authors have never witnessed a recovery. The authors believe that the virus is identical with that of rabies. ROSENBUSCH they say is at present carrying out cross immunity tests at Buenos Aires.

A close experimental study of the virus of " mad itch," a rare disease of cattle in America, is made by SHOPE[7]. The disease in its clinical features closely resembles the pseudo-rabies of AUJESZKY. Both are characterized by pruritus, and in both the animals become progressively weaker and die. The incubation periods and periods of sickness are the same. The post-mortem findings are identical. In pseudo-rabies the virus can be demonstrated in the brain and other organs, in mad itch it is localized largely in the region of inoculation and in the lung. Both are filter passers. Pseudo-rabies virus is neutralized by anti-" mad itch " sera. The author arrives at the tentative conclusion that the inciting agents of both diseases are the same, although the strains of the two viruses under study possess readily demonstrable differences.

It will be remembered that CUNNINGHAM, NICOLAS, and LAHIRI found that the Kasauli strain of fixed virus was less resistant to ether than the Paris strain (this *Bulletin*, Vol. 27, p. 746). REMLINGER, PALMOWITCH and BAILLY[8] have compared the resistances of strains of virus. The fixed virus of Tangier resisted submersion for 120 hours ; three other strains of fixed virus from European institutes were alive after 120, 168, and 144 hours. The reinforced street virus of Chisinau and the virus of mal de caderas of cattle in Paraguay (virus Rosenbusch) resisted immersion for 120 hours. The authors stress with CUNNINGHAM and his co-workers the necessity of determining the resistance of the strain of fixed virus employed, before using etherized vaccines.

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6 REMLINGER (P.) & BAILLY (J.). Identité du mal de Caderas et de la rage.—*Bull. Acad. Méd.* 1931. July 28. Year 95. 3rd Ser. Vol. 106. No. 28. pp. 71–79. [16 refs.] [Pasteur Inst., Tangiers.]

7 SHOPE (Richard E.). An Experimental Study of " Mad Itch " with Especial Reference to its Relationship to Pseudorabies.—*Jl. Experim. Med.* 1931. Aug. 1. Vol. 54. No. 2. pp. 233–248. [12 refs.] [Rockefeller Inst. for Med. Research, Princeton, N.J.]

8 REMLINGER (P.), PALMOWITCH (S.) & BAILLY (J.). Action de l'éther sur diverses souches de virus rabiques.—*C.R. Soc. Biol.* 1931. June 30. Vol. 107. No. 21. pp. 760–762. [3 refs.] [Pasteur Inst. of Morocco, Tangiers.]

Remlinger, Palmowitch and Bailly[9] in examining a number of strains of fixed virus, find that some of these are peculiarly prone to cause paralytic accidents in the dog. Others are quite inoffensive. Although the dog is more subject to such accidents than man, the results obtained are important. A virus T has been used in the case of more than 2,000 dogs with a single rather doubtful case of paralysis. A virus Z was exhibited to 4 dogs, 2 by the method of Becker Philipps, and two after etherization, without untoward effect. Seven dogs were vaccinated with a virus V, 2 by the Becker Philipps method, and 5 after etherization. A fatal case of paralysis occurred in one case which had been given ether vaccine. Eight dogs were treated with a virus B, 2 by the Becker Philipps method, the remainder with etherized vaccine ; one of the former group showed paralysis after 21 days and died, and one of the second group became paralysed after 18 days, and likewise died. The authors conclude that all institutes should be supplied with a standard inoffensive strain. [This would appear to be a further example of the varying resistance of strains of fixed virus to ether—and other substances—referred to in the previous paper.]

A strain of street virus of exalted virulence (Safad virus) has been investigated by Stuart and Krikorian[10]. Seven persons were bitten by a rabid jackal and three, in spite of treatment, developed rabies. The incubation periods of the three fatal cases were respectively 17 days (one : deep : face), 29 days (two : deep : face) and 37 days (one : deep : head). Treatment was commenced in each case two days after the bite was inflicted. This virus (Safad) was compared with fixed virus (Paris) and a strain of street virus from Jaffa. Using the definition of a minimum lethal dose as, " the highest dilution of a virus which, in rabbits of average weight (1,400 gm.) will invariably produce symptoms in the same period of time after subdural infection with 0·2 cc.", the authors found that this dilution was 1 in 1,000 in the case of each of the three viruses. The Safad virus caused illness in 7 days in the rabbit, and death on the 8th day. Negri bodies were present in the human brain from which the virus was derived but were not found in the brains of any of the rabbits of a subpassage series.

Cross immunity experiments were carried out between the Paris fixed virus and the Safad virus. The Paris virus afforded 100 per cent. protection against the homologous strain and 60 per cent. against the Safad strain. Also sera of rabbits treated with Paris virus neutralized 6 volumes of a 1 per cent. suspension of the homologous strain, and 4 volumes of the Safad strain. Again vaccination with the Safad virus afforded 40 per cent. protection against the homologous strain, and 20 per cent. against the Paris strain. Also sera from a rabbit treated with Safad virus neutralized 2 volumes of the homologous virus, and one volume of the Paris strain.

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[9] Remlinger (P.), Palmowitch (S.) & Bailly (J.). Pluralité des virus rabiques fixes. Nocivité de quelques-uns.—*C.R. Soc. Biol.* 1931. July 16. Vol. 107. No. 23. pp. 1050–1052. [Pasteur Inst. of Morocco, Tangiers.]

[10] Stuart (G.) & Krikorian (K. S.). Further Studies in Anti-Rabies Immunisation. Rabies Virus—Exalted and Classical Strains compared.—*Jl. Hygiene.* 1931. Oct. Vol. 31. No. 4. pp. 523–542. [40 refs.] [Central Labs., Health Dept., Govt. of Palestine.]

Kaktin[11] reports that the fixed virus strain in use at Riga came originally from Paris. It is at present in its 1,603rd passage. Its minimum lethal dose for rabbits was found to be 0·1 cc. of a 1 in 300,000 dilution from an experiment conducted on 15 rabbits. A subcutaneous dose of 0·1 cc. of a 1 in 10 emulsion is not infective to either guineapigs or rabbits. Intravenous doses were also innocuous. Rabies frequently developed after intracutaneous inoculation of large doses but seldom after intramuscular doses.

ii. *Clinical.*

Gordon[12] describes a case of protracted incubation. The patient, a man aged 19 years, was bitten on the hand by a stray dog. Treatment by Högyes method (in all 205 mgm. of brain substance over a lengthy period), was commenced on the day after he had been bitten. On the 346th day after the bite he became ill, and exhibited the classic symptoms of rabies. On the 353rd day he died. Numerous Negri bodies were found in his brain, and rabbits inoculated with portions of his brain developed rabies in 15 days.

iii. *Pathology.*

In a previous paper Palawandow and Serebrennaja[13] (this *Bulletin*, Vol. 28, p. 245) reported the cases of two persons suffering from rabies whose saliva on the day previous to death was found to contain the virus. They now add to these a further group of three cases in which a like result, as proved by animal inoculation and the finding of Negri bodies in the brains of the experimental animals, was obtained. They again emphasize the fact that in order to observe positive results, at least 2 cc. of saliva must be given intramuscularly, preferably to guineapigs.

Palawandow and Serebrennaja[14] have failed to confirm the observation of Remlinger and Bailly that the virus when introduced into the brain of dog or rabbit disappears at the site of inoculation within 24 hours (the phenomenon of "eclipse"), and then reappears 2 to 3 days later (this *Bulletin*, Vol. 27, p. 251). From experiments on 45 rabbits with fixed virus they find that there is rather a gradual heaping up of virus in the brain. A similar series of experiments on 73 rabbits with street virus gave a like result. With a strain of street virus with a very short incubation period the virus can be recovered even after 24 hours. The factors which are important are the incubation period of the virus, and the dose administered.

The degree of antibody production after treatment with living

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11 Kaktin (A.). Ueber einige biologische Eigenschaften des in Riga verwandten Virus fixe. I. Mitteilung.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 72. No. 5/6. pp. 457–461. [4 refs.]

12 Gordon (J.). Sur l'incubation énormément prolongée de la rage humaine.—*Rev. Microbiol., Epidémiol. et Parasit.* 1931. Vol. 10. No. 1. pp. 31–38. [12 refs.] [In Russian. French summary pp. 38–39.]

13 Palawandow (H.) & Serebrennaja (A. I.). Ueber das Wutvirus im menschlichen Speichel. III. Mitteilung.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 71. No. 3/4. pp. 350–351. [State Bact. Inst., Odessa.]

14 Palawandow (H.) & Serebrennaja (A. I.). Ueber den Befund von Wutvirus im Zentralnervensystem bei Tieren während verschiedener Inkubationsstadien bei subduraler Infizierung.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 71. No. 3/4. pp. 352–358. [3 refs.] [State Bact. Inst., Odessa.]

fixed virus, killed carbolized fixed virus and killed etherized fixed virus has been investigated by STUART and KRIKORIAN[15]. The amount of brain substance inoculated was in each case 1·4 gm. given over a period of 14 days. The maximum power of neutralization was in the case of living fixed virus, 1 vol. of serum to 16 vols. of a 1 per cent. suspension of fixed virus ; the proportion in the case of killed carbolized virus was 1 to 8 vols. ; and in the case of killed etherized vaccine it was 1 to 24 vols. The times of earliest appearance were, in the same order, 18 days after commencement of treatment, 18 days, and 14 days. The maxima occurred in all the three types between the 50th and the 60th day after completion of treatment. The periods of retention of rabicidal properties were 222 days, 131 days, and 226 days. The authors conclude that in the immune sera of rabbits treated with killed etherized fixed virus, antibodies make an earlier appearance, are present in greater degree, and persist for a longer time than in the sera of rabbits treated with equal quantities by weight of fresh fixed or of killed carbolized virus.

iv. *Methods of Treatment and Statistics.*

REMLINGER, PALMOWITCH and BAILLY[16] have investigated the statement of LÖFFLER and SCHWEINBURG (this *Bulletin*, Vol. 27, p. 751), that repeated inoculations of nerve substance weakens resistance against a subsequent infection with rabies, and that therefore either the quantity of nerve substance used in treatment should be as small as possible, or the lipoids should be extracted from it. In their investigation REMLINGER and his co-workers used 21 rabbits, to which were given 100 cc. of a 1 in 50 emulsion of normal brain of the cat in 20 doses. Five days after the last injection the rabbits were tested with 0·5 cc. of fixed virus, graded in strength from 1 in 2,000 to 1 in 150,000 ; one untreated animal receiving a similar dose in each grade. There was no evidence of any weakened resistance.

According to HÖGYES a dilution of 1 in 5,000 of fixed virus is sometimes fatal to the rabbit, and a dilution of 1 in 10,000 is never harmful. REMLINGER, PALMOWITCH and BAILLY[17] rightly point out that this view, which is axiomatic, and is the basis of the dilution method of treatment, cannot be accepted. The determination of a minimum lethal dose cannot be exact on account of variations in technique (and statistical variation). Dilutions up to 1 in 300,000 have from time to time, as is to be expected, given positive results when inoculated in a dose of 0·5 cc. subdurally. " One recognizes also the gravity of the paralyses which occur during treatment by dilutions of virus. It is in effect a question, in these cases, less of paralyses of treatment than of true paralytic rabies."

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[15] STUART (G.) & KRIKORIAN (K. S.). Appearance and Persistence in Rabbits' Blood of Rabicidal Antibodies produced by Various Methods of Anti-Rabies Immunisation.—*Jl. Hygiene.* 1931. July. Vol. 31. No. 3. pp. 414–422. With 1 graph. [4 refs.] [Govt. Central Labs., Jerusalem.]

[16] REMLINGER (P.), PALMOWITCH (S.) & BAILLY (J.). La substance nerveuse normale peut-elle rendre les lapins plus sensibles à l'action du virus rabique fixe?—*C.R. Soc. Biol.* 1931. June 19. Vol. 107. No. 20. pp. 683–685. [2 refs.] [Pasteur Inst. of Morocco, Tangiers.]

[17] REMLINGER (P.), PALMOWITCH (S.) & BAILLY (J.). Contribution à l'étude de l'action de la dilution sur le virus rabique.—*C.R. Soc. Biol.* 1931. July 21. Vol. 107. No. 24. pp. 1244–1246. [2 refs.] [Pasteur Inst. of Morocco, Tangiers.]

Remlinger and Bailly[18] discuss the value of antirabic serum in the treatment of rabies. "It is difficult to obtain, irregular in its production, and paradoxical in its mode of action."

The successful treatment of eight persons bitten severely by a wolf, by killed phenol vaccine is reported by Stuart and Krikorian[19]. The dosage amounted to 0·7 gm. over a period of 14 days. The sera of one of the patients was examined for rabicidal properties. These became demonstrable on the 23rd day after the commencement of treatment, and persisted up to the 88th day. On the 100th day they were no longer apparent. [This high degree of success has not been attained at other institutes. In the first review of antirabies treatment published by the League of Nations, it appears that of 19 persons bitten by wolves and treated by killed vaccines, 5 died. The fatal cases were reported from Bombay (5 out of 15 treated) as is shown in Appendix xxiv *bis* of that review. It is to be noted, however, that of the 5, one was one day late in commencing treatment, a second was 7 days late, a third was 25 days late, and the remaining 2 were 30 days late.]

The system of treatment employed at the Antirabic Dispensary in Cyrenaica is described by Medulla[20]. The vaccine is Puntoni's modification of Fermi phenol vaccine. During the years 1928, 1929, 1930 and 1931, 7, 18, 21 and 7 persons respectively were successfully treated.

Treatment[21] at the Pasteur Institute of the Charity Hospital, New Orleans (U.S.A.), was afforded to 766 persons during the year 1929, and to 467 during 1930. The method employed is that of Semple. One patient, 7 years old, and bitten severely about the face, died of rabies 41 days after completion of a course of 14 days' treatment. No paralytic accidents were observed.

The question of decentralization of antirabic treatment is discussed by Bobes[22]. It has been applied in Russia, in India, and in Germany, the vaccines used being prepared according to the methods of Calmette, Fermi, Philipps, Semple, etc. Decentralization has obvious advantages, but there are disadvantages which the author lays stress on. "The difficulty of gauging the intensity of treatment in individual cases, the difficulty of avoiding paralytic accident, the difficulty of keeping the animal under rigorous control during the period of observation, and finally the diversity of methods of treatment. Only when statistical evidence collected by the League of Nations and based upon results from all institutes renders it possible to establish a standard method of treatment, will one be in a position to consider decentralization."

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[18] Remlinger (P.) & Bailly (J.). La déchéance du sérum antirabique.—*Bull. Acad. Vét. de France.* 1931. May 7. pp. 239–243. [Summarized in *Bull. Inst. Pasteur.* 1931. Oct. 31. Vol. 29. No. 20. pp. 989–990.]

[19] Stuart (G.) & Krikorian (K. S.). Anti-Rabies Immunisation. Value of Killed Carbolised Virus in Cases of Wolf-Bite.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. June 30. Vol. 25. No. 1. pp. 49–56. [11 refs.]

[20] Medulla (Candido). Dati statistici sul funzionamento del dispensario antirabico dall' ottobre 1928 all' aprile 1931.—*Arch. Ital. Sci. Med. Colon.* 1931. Oct. 1. Vol. 12. No. 10. pp. 605–612. With 1 text fig. English summary (2 lines).

[21] d'Aunoy (Rigney) & Beven (J. L.). Antirabic Vaccinations at the Charity Hospital of New Orleans for the Years 1929–1930. —*Amer. Jl. Clin. Path.* 1931. July. Vol. 1. No. 4. pp. 333–338. [Charity Hosp., & Med. School, Louisiana State Univ., New Orleans.]

[22] Bobes (S.). Problema institutelor antirabice.—*Rev. Igienă Social'.* Bucharest. 1931. Jan. Vol. 1. No. 1. pp. 31–36. French summary.

v. *Post-Vaccinal Accidents.*

A case of paralytic accident is described in detail by VAMPRÉ and CARVALHO[23]. The patient received a 14 day treatment with cords dried from 7 to 2 days. The symptoms were those of paralysis of legs, and retention of urine and faeces. Reflexes were abolished. Sensibility was lost below the waist. Galvanic response was not impaired. The etiology, diagnosis, prognosis, and treatment of the condition, are discussed.

vi. *Rabies in Animals.*

REMLINGER and BAILLY[24] have extended their observations on the persistence of rabies virus in the brain of the tortoise. In a previous communication (this *Bulletin*, Vol. 27, p. 252), they stated that it persisted for at least 54 days. They now in a series involving 26 tortoises, find that this period may be extended to 302 days.

A case of rabies in a badger is reported by LENTZE[25]. Negri bodies were found in the brain, and animal inoculation proved positive.

Vaccine consisting of 15 parts of fixed virus brain substance, in 85 parts of glycerinated and phenolized physiological salt solution (30 per cent. glycerine and 0·5 phenol), is employed in the treatment of animals by TORRES[26], at Rio de Janeiro. The vaccine retains its activity for about 100 days when kept at 10° C. The dosage varies from 3 cc. for small dogs to 40 cc. in the case of animals of over 500 kgm. A single dose is given. The immunity lasts for about a year. In the years 1927, 1928 and 1929, 1,219, 1,352, and 1,691 animals were inoculated in the state of Espirito Santo. There has been a fall in the cases of rabies reported, viz.: 837 in 1925, 595 in 1926, 355 in 1927, and 155 in 1928, in the municipality of Cariacica. The communication is followed by a general discussion on the antirabic treatment of animals by a commission elected for the purpose.

Using a 1 in 10 dilution of street virus (formolated 1 per cent.), GALEA[27] found that a minimum of 20 cc. (i.e., 2 gm. of nerve substance) in a single dose is necessary for immunizing the rabbit. Using repeated doses of a 1 in 10 dilution of vaccine (formolated 4 per thousand), dogs can be made to resist intra-ocular infection made 24 hours after vaccination. Cutivaccination of guineapigs with 2 to 4 grams of vaccine (formolated 1 per cent.) failed to give satisfactory results.

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[23] VAMPRÉ (E.) & CARVALHO (Pedro Egydio de Oliveira). Em torno de um caso de accidente paralytico do tratamento anti-rabico.—*Brasil-Medico.* 1931. Sept. 5. Vol. 45. No. 36. pp. 821–827. With 3 text figs. [Psychiat. & Neurol. Clinic, Faculty of Med., S. Paulo.]

[24] REMLINGER (P.) & BAILLY (J.). Sur la longue persistance (302 jours) du virus rabique dans l'encéphale de la tortue.—*C.R. Soc. Biol.* 1931. Oct. 30. Vol. 108. No. 30. pp. 466–468. [1 ref.] [Pasteur Inst. of Morocco, Tangiers.]

[25] LENTZE (F. A.). Bissverletzung durch tollwütigen Dachs.—*Muench. Med. Woch.* 1931. July 17. Vol. 78. No. 29. p. 1218. [3 refs.] [Hyg. Inst., Univ., Breslau.]

[26] TORRES (Sylvio). Technica para preparo de vaccina antirabica para uso animal.—*Rev. Zootechnia e Vet.* 1931. Vol. 17. No. 2. pp. 129–140. [2 refs.]

[27] GALEA (M.). Recherches sur la vaccination antirabique avec du virus des rues formolé.—*Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1930. Dec. Vol. 3. No. 4. pp. 447–457. [22 refs.]

The intravenous inoculation of 25 cc. of vaccine (formolated 4 per cent.) established a solid immunity.

SCHOENING[28] again discusses the efficiency of single doses of phenol killed and chloroform killed vaccines (see also this *Bulletin*, Vol. 28, p. 748). He favours the second variety both as regards potency and as regards safety.

A general review of antirabies immunization is furnished by KELSER[29], which incidentally covers the same ground as the above.

PLANTUREUX[30] records results of the treatment of bitten animals by formolized vaccine. (See also this *Bulletin*, Vol. 27, p. 263). Of a total of 79 animals—16 horses, 15 donkeys, 40 cattle, 2 goats, and 6 swine—treated with 4 inoculations at intervals of a week by formolized vaccine, two contracted the disease. These were two young cattle, severely bitten on the ears. The one died on the 13th day, and the other on the 43rd.

vii. *Miscellaneous.*

GLUSMAN, GORFUNKEL and SSOLOWIEWA[31] have conducted a series of experiments on the cataphoresis of rabies virus—(see also this *Bulletin*, Vol. 28, p. 247). The apparatus employed is that of TODD as modified by SSINZOWA. The emulsion in a concentration of 1 in 500 is made up with potassium biphthalate, biphosphate, and borate as buffers to a pH of 6·0 to 9·3. After the passage of a current for from 2 to 3 hours material is withdrawn from the anode and from the cathode, and injected into rabbits. In a series of 27 experiments with fixed virus, the virus was found at the anode in 21, at the cathode in 6, and it was present at both poles in 6. The pH in this series lay between 6·0 and 9·3. As the pH rises so does the rate of separation fall. The authors state that a movement of the whole emulsion took place, and that there was no evidence of a separation of the virus from the material to which it was attached.

As the result of a series of experiments MARIE and URBAIN[32] conclude that there is no evidence of antagonistic action between the viruses of herpes and of rabies. When mixed in vitro there was no evidence of neutralization of one virus by the other, and cross immunity experiments gave negative results.

A. G. McKendrick.

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[28] SCHOENING (H. W.). Immunization of Dogs against Rabies by the One-Injection Method.—*Amer. Jl. Public Health.* 1931. June. Vol. 21. No. 6. pp. 637–640. [7 refs.] [U.S. Bureau of Animal Industry, Washington, D.C.]

[29] KELSER (R. A.). Rabies Immunization.—*Milit. Surgeon.* 1931. July. Vol. 69. No. 1. pp. 34–41. [8 refs.] [Army Med. School, Washington.]

[30] PLANTUREUX (E.). Sur] le traitement des herbivores après morsure par le vaccin antirabique formolé.—*Rev. Gén. de Méd. Vét.* 1931. Nov. 15. Vol. 40. No. 479. pp. 649–652. [1 ref.] [Pasteur Inst. of Algeria, Algiers.]

[31] GLUSMAN (M. P.), GORFUNKEL (D. M.) & SSOLOWIEWA (J. W.). Zur Frage der elektrischen Ladung des Lyssa-Virus.—*Zent. f. Bakt.* I. Abt. Orig. 1931. Aug. 11. Vol. 121. No. 7/8. pp. 476–481. With 1 text fig. [19 refs.] [Metschnikow Inst., Kharkov.]

[32] MARIE (A. C.) & URBAIN (Ach.). Sur l'antagonisme du virus herpétique et du virus rabique.—*C.R. Soc. Biol.* 1931. Sept. 18. Vol. 107. No. 26. pp. 1488–1490. [2 refs.]

YELLOW FEVER.

BEEUWKES (Henry) & HAYNE (T. B.). **An Experimental Demonstration of the Infectivity with Yellow Fever Virus of *Aëdes aegypti* captured in an African Town.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Aug. 8. Vol. 25. No. 2. pp. 107–110. [1 ref.] [West African Yellow Fever Commission, Internat. Health Division, Rockefeller Foundation, Lagos, Nigeria.]

The difficulty of clinical identification of mild cases of yellow fever led the authors to test the possibility of demonstrating the existence of active virus in mosquitoes caught in endemic regions. Catches were made in native houses at Ife where protection tests showed that 68 per cent. of 25 children had contracted the disease [see this *Bulletin*, Vol. 28, p. 283].

Two normal monkeys were exposed to the bites of 156 mosquitoes, but with negative results; finally, 143 mosquitoes remaining alive were killed, and an emulsion of their bodies inoculated into these same two monkeys. The first of these died of typical yellow fever 4 days later, and the second had a non-fatal attack of this disease. Subsequently 561 Aedes were caught in the same region and tested, but failed to produce any infection and similar negative results were obtained with large numbers of mosquitoes caught in Ibadan, another endemic centre. It would seem, therefore, that in spite of the positive result in the first experiment, the chances of capturing infected mosquitoes in native towns are too remote for this method to constitute a satisfactory aid in confirming the existence of active infection in any area.

E. Hindle.

FROBISHER (Martin), Jr., DAVIS (Nelson C.) & SHANNON (Raymond C.). **On the Failure of Yellow Fever Virus to persist in a Colony of *Aëdes aegypti*.**—*Amer. Jl. Hyg.* 1931. July. Vol. 14. No. 1. pp. 142–146. [4 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The experiments of ARAGÃO and da Costa LIMA [see this *Bulletin*, Vol. 26, p. 1001], showed that yellow fever might be produced by the dejecta of infected mosquitoes, whilst ARAGÃO [*ibid*, p. 1002] also showed that the virus might pass from the male to the female mosquito and vice versa, presumably by coitus. In order to test the possibility of the infection being maintained in this way, the authors placed 300 freshly fed infected mosquitoes inside a breeding cage together with 90 males. The eggs laid by these insects were hatched out separately and these newly hatched mosquitoes added to the breeding cage. A normal rhesus monkey was placed in the breeding cage every fortnight to test the infectivity of the mosquitoes. The results show that the colony remained infective for at least 12 weeks when the original mosquitoes were 103 to 104 days old, but beyond 16 weeks the infectivity had died out. It seems practically certain, therefore, that in nature yellow fever is not self propagated among mosquitoes and that they could not remain infective without some suitable vertebrate host.

E. H.

DAVIS (Nelson C.) & SHANNON (Raymond C.). **Further Attempts to transmit Yellow Fever with Mosquitoes of South America.**—*Amer. Jl. Hyg.* 1931. Nov. Vol. 14. No. 3. pp. 715–722. [4 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

Various species of Brazilian mosquitoes were allowed to feed on monkeys infected with yellow fever and after they had been kept in the laboratory for 12 or more days were allowed to bite normal monkeys. Also the survival of virus in these insects was tested by injecting their bodies into normal monkeys. The virus was found to survive for 12 or more days in *Aedes terrens*, *Aedes serratus*, *Psorophora cingulata*, *Psorophora ferox*, *Mansonia fasciolata*, *M. chrysonotum*, and *M. albicosta*. It was not found to survive for this period in *Aedes fulvithorax*, *Anopheles albitarsis*, *An. tarsimaculatus*, *Culex quinquefasciatus*, and *Joblotia digitata*. No infections resulted from the bites of any of the species used in these tests.

E. H.

BAUER (Johannes H.). **Some Characteristics of Yellow Fever Virus.**—*Amer. Jl. Trop. Med.* 1931. Sept. Vol. 11. No. 5. pp. 337–353. [11 refs.] [Labs. of the W. African Yellow Fever Commission, Internat. Health Division, Rockefeller Foundation, Lagos.]

The author gives interesting details of the very high concentration of yellow fever virus in the blood of infected rhesus monkeys at the onset of fever. Eighteen specimens tested in dilutions of 1 : 1,000,000 all proved infective, and of six specimens tested in dilutions of 1 : 1,000,000,000 three produced fatal infections in normal monkeys. A considerable variation in susceptibility was observed when these high dilutions were employed, and very small amounts of virus often immunized animals without producing any outward signs of infection [as noted by the reviewer, see this *Bulletin*, Vol. 26, p. 292]. In the majority of these animals inoculated with minute doses, the infection was characterized by a rather long incubation period, followed usually by a short but acute febrile attack and death.

Human hydrocele fluid from persons not immune to yellow fever, either concentrated or diluted with equal parts of physiological saline, was found to be a satisfactory diluent of the virus for titration purposes.

The development of yellow fever antibodies in the blood of experimentally infected animals was found to take place early during the course of the disease and the serum of monkeys that died on the seventh day after inoculation or later, protected fully against massive doses of the virus. Curiously enough, however, the serum of monkeys inoculated with very minute doses of the virus, and which died of yellow fever after a long incubation period, showed no protective properties.

The virus was found to survive in the body for some time after death, for the blood of a monkey that died of yellow fever and was kept after death for nine hours at a temperature of 78 to 86·5° F. was still infective in amounts of 0·01 cc., although 0·0001 cc. failed to infect. The organs of this animal were then in an advanced state of decomposition ; therefore the virus must possess considerable resistance against the action of post-mortem invading bacteria.

E. H.

SELLARDS (Andrew Watson). **The Behavior of the Virus of Yellow Fever in Monkeys and Mice.**—*Proc. Nat. Acad. Sci.* 1931. June. Vol. 17. No. 6. pp. 339–343. [2 refs.] [Harvard Med. School, Boston.]

A strain of yellow fever virus maintained by repeated passage from brain to brain in mice till it no longer infected monkeys by the ordinary routes of injection, was compared with the original strain that had been maintained in monkeys and mosquitoes. Monkeys inoculated intracerebrally with a suspension of infected mouse brain regularly developed a fatal encephalitis, but without any characteristic changes in the liver. The blood of these animals was not infective to monkeys in two experiments, one by direct inoculation and the other by means of mosquitoes.

Direct inoculation from brain to brain through a series of four monkeys failed to restore the virulence of the strain, which still produced no infection when inoculated intraperitoneally into monkeys. Two monkeys inoculated intracerebrally with blood virus died of typical yellow fever with necrosis of the liver and no signs of encephalitis.

The results of cross-immunity tests were consistent with the interpretation that the virus in mice is yellow fever, but the cross protection although very well-marked was not entirely complete.

E. H.

SAWYER (W. A.) & LLOYD (Wray). **The Use of Mice in Tests of Immunity against Yellow Fever.**—*Jl. Experim. Med.* 1931. Oct. 1. Vol. 54. No. 4. pp. 533–555. With 1 fig. [18 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, New York.]

The authors have modified THEILER'S original method of using mice in yellow fever immunity tests [this *Bulletin*, Vol. 27, p. 872], as the small amount of serum that could be injected intracerebrally failed to give complete protection in a number of cases. It was found that if mice were injected intraperitoneally with a large dose of yellow fever virus, fixed for mice, and at the same time some slight injury was made in the central nervous system, the mice died of yellow fever encephalitis. The virus was found to circulate in the blood up to 4 days before becoming localized in the brain. Using this technique a method of testing sera has been developed which the authors call the "intraperitoneal protection test in mice." The test consists of the intraperitoneal inoculation of mice with a mixture of mouse yellow fever virus, and the serum to be tested, and at the same time an intracerebral injection of 0·03 cc. of 2 per cent. corn starch in 0·9 per cent. sodium chloride, in order to localize the virus in the brain. If the serum lacks protective power the mice die of yellow fever encephalitis. It was found that different strains of mice varied considerably in their susceptibility to the virus and it would be preferable to use the same strain bred on the premises. The amount of virus is important, for in one experiment whilst quantities of less than 0·2 cc. of a 10 per cent. suspension of mouse brain were not always fatal, doses of this amount or more invariably caused death. Consequently this dose of virus was adopted, and mixed with 0·4 cc. of the serum to be tested, and the mixture inoculated intraperitoneally. If the mouse did not succumb within 10 days there was considered to

be evidence of protection. The test was found to be highly sensitive and many sera which protected mice did not protect monkeys, although all those which protected monkeys also protected mice. Consequently, it will be of value in epidemiological studies to determine whether individuals have ever had yellow fever, and also to test whether vaccinated persons or animals have in reality been immunized. Finally attention is called to the unusual precautions necessary to avoid the infection of laboratory personnel with yellow fever virus from infected mice, three such infections having already occurred.

E. H.

Torres (C. Magarinos). [In Portuguese & English.] Degeneração oxychromatica (" inclusoes intranucleares ") na febre amarella. **Oxychromatic Degeneration (" Intranuclear Inclusions ") in Yellow Fever.**—*Mem. Inst. Oswaldo Cruz.* 1931. Vol. 25. No. 2. In Portuguese pp. 81–147. With 72 coloured figs. on 3 plates. [46 refs.] In English pp. 148–211.

This valuable monograph contains a complete summary of the author's observations since his original paper, in which he first called attention to the significance of intranuclear inclusions in the liver cells of monkeys infected with yellow fever [see this *Bulletin*, Vol. 26, p. 301]. It is rather unfortunate that this characteristic oxychromatic degeneration, although nearly always present in monkeys dying of yellow fever, is frequently absent in human cases of the disease where a character of this nature, if constantly present, would be of great assistance in the histopathological diagnosis of doubtful cases.

The author discusses the various changes occurring in the nuclei and their significance, and his paper is very well illustrated by coloured figures giving a clear picture of these changes. The article should be consulted in its entirety by all those interested in the subject, since it contains many technical details and observations that do not lend themselves to abstraction.

E. H.

Frobisher (Martin), Jr. **Electrophoresis Experiments with the Virus and Protective Bodies of Yellow Fever.**—*Jl. Experim. Med.* 1931. Nov. 1. Vol. 54. No. 5. pp. 733–745. With 1 text fig. [20 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

The author has investigated the electrophoresis of yellow fever virus and its antibodies, using a U-tube apparatus with a central arm by means of which the suspension could be introduced. Although many of the results were indefinite, evidence was obtained that in clear, haemoglobin-free, serum dilutions, with a pH of 7·4 to 7·7, the active virus, both from the blood and the mosquito, travels towards the negative pole. Between pH 7·4 and pH 6·2 the virus passes through its isoelectric range and then tends to reverse the direction of its migration, thus behaving like an amphoteric colloid. At a pH of 5·0 it is inactivated within three hours. When the suspension was mixed with red cells and distilled water, the virus also migrated towards the positive pole, possibly because it adsorbed haemoglobin. These results agree in the main respects with those obtained by Hindle and Findlay [see this *Bulletin*, Vol. 27, p. 872.]

The antibodies were similarly examined by introducing immune serum into the central arm of the U-tube and then testing the protective value of the contents of anode and cathode arms after passing a current for about 5 hours. In slightly alkaline dilutions the protective bodies were found to carry a negative charge.

E. H.

Wakeman (A. Maurice) & Morrell (Clare A.). **Chemistry and Metabolism in Experimental Yellow Fever in** *Macacus rhesus.* **IV. Tolerance Tests for Dextrose.**—*Arch. Intern. Med.* 1931. Aug. Vol. 48. No. 2. pp. 301–312. With 4 charts. [8 refs.] [Lab. of the W. African Yellow Fever Commission, Internat. Health Division, Rockefeller Foundation, Lagos.]

The response of the blood sugar of normal monkeys to dextrose administered by mouth is irregular; monkeys seriously ill with yellow fever show practically no increase in blood sugar after the ingestion of 1 gm. per kilo, chiefly because the sugar is absorbed very slowly, if at all, from the alimentary canal. Tolerance for sugar is diminished in yellow fever before the monkey becomes prostrate. Dextrose injected intravenously is not so rapidly removed from the blood of monkeys ill with yellow fever as from the blood of normal monkeys. In the latter the intravenous injection of dextrose produces accelerated glycogenesis in the liver and there is a crossing of the curves for arterial and venous blood sugar. This crossing is absent in yellow fever monkeys, indicating a loss of hepatic function.

E. H.

Frobisher (Martin), Jr. **An Improved Antigen for the Complement-Fixation Test in Yellow Fever.**—*Amer. Jl. Hyg.* 1931. July. Vol. 14. No. 1. pp. 147–148. [5 refs.] [Yellow Fever Lab., Internat. Health Division, Rockefeller Foundation, Bahia, Brazil.]

An improved antigen has been prepared by extracting the fat from the dried livers of infected rhesus monkeys. The paste of each liver was placed in a desiccator and dried over sulphuric acid *in vacuo*; subsequently the dried livers were placed in a Soxhlet's apparatus and treated with ether for 8 hours or more. The fat-free residue has been found to preserve its properties for some months at room temperature.

E. H.

Hudson (N. Paul). **Protective and Complement-binding Bodies in the Serum of Human Yellow Fever Convalescents.**—*Proc. Soc. Experim. Biol. & Med.* 1931. June. Vol. 28. No. 9. pp. 937–939. [Internat. Health Division, Rockefeller Foundation, & Dept. of Hyg. & Bact., Univ., Chicago.]

The author made a serological study of five cases of yellow fever due to laboratory infections. The results show that protective antibodies appeared in the blood five days after the onset of illness, whilst the complement fixation in the same patients did not develop until after 8 weeks in four cases, and remained negative in the fifth. The appearance of positive fixation reactions later than protective antibodies is of interest and suggests either the crudeness of the test or the persistence of virus in the host.

E. H.

Findlay (G. M.) & Hindle (E.). **Combined Use of Living Virus and Immune Serum for Immunization against Virus Infections.**—*Brit. Med. Jl.* 1931. May 2. pp. 740–742. [18 refs.]

The authors recommend the use of virus and immune serum for immunization against virus diseases in general, and give records of experiments with this method in the case of two widely different infections, vaccinia and yellow fever. In the case of yellow fever it is shown that whereas the duration of passive immunity rarely exceeds four or five weeks, when a dose of virus is given at the same time as the immune serum a more lasting immunity is obtained which in the case of monkeys has been tested up to a minimum of fourteen months.

It is also shown that yellow fever immune serum has no apparent action upon the virus *in vitro*, for a mixture of virus and immune serum, after standing for eighteen hours, was centrifuged, and the resulting sediment washed three times to remove the immune serum. The washed sediment was inoculated into a rhesus monkey, which died six days later of typical yellow fever, whilst another monkey inoculated with part of the original mixture showed no signs of infection but was immunized.

E. H.

Aragão (Henrique de Beaurepaire). [In Portuguese & English.] Sôro-virus vaccinação na febre amarella. **Vaccination with Serum-Virus in Yellow Fever.**—*Mem. Inst. Oswaldo Cruz.* 1931. Vol. 25. No. 2. In Portuguese pp. 213–219. In English pp. 220–226.

The author records the results of inoculating five rhesus monkeys with yellow fever virus and immune serum. In every case a solid immunity was produced without any ill effects being observed. Doses of less than 1 cc. of immune serum in monkeys did not prevent a febrile reaction and therefore doses of 4 to 5 cc. are recommended for human cases. It is suggested that the use of serum-virus might give satisfactory results for human vaccination. [Findlay and Hindle (above) also recommend a trial of this method.]

E. H.

Dinger (J. E.). Dengue en gele koorts. I. Inleiding. [**Dengue and Yellow Fever.**]—*Nederl. Tijdschr. v. Geneesk.* 1931. June 20. 75th Year. No. 25. pp. 3363–3369.

The question of conferment of immunity to yellow fever by a previous infection with dengue was tested out on monkeys. Eleven monkeys, which had suffered from dengue 13 to 36 days previously were inoculated with virulent yellow fever material. Of these three died of typical yellow fever, and the remainder were unaffected, while control animals showed a 90 to 100 per cent. mortality. In this experiment there is a strong presumption that the survival of so many animals was due to the production of immunity to yellow fever brought about by a previous attack of dengue.

Trials upon volunteers show that there is every reason to believe that 5 and 7-day fevers are identical with dengue, for the fever in these experimental cases is sometimes of similar duration. In other ways also this disease is very variable, as for example in the matter of the peaks of the saddle temperature curve. The marked leucopenia which

is characteristic of dengue is probably partly due to destruction of polynuclears and partly to their differential distribution in the body. Relapses did not occur.

W. F. Harvey.

Peña Chavarría (Antonio), Serpa (Roberto) & Bevier (George). La epidemia de fiebre amarilla en el Socorro (Colombia) 1929. [**The Yellow Fever Epidemic of 1929 in Socorro (Colombia).**]—*Medicina Países Cálidos.* Madrid. 1931. May & July. Vol. 4. Nos. 3 & 4. pp. 217–235; 315–326. With 3 maps, 1 chart & 4 figs. (1 map). [23 refs.]

Before dealing with the actual outbreak to which the title refers the authors present an interesting historical account of yellow fever or presumed yellow fever in Colombia dating from 1509, and follow this by a description of the topography, climate, communications and such factors as may bear actiologically on this disease. Early in 1929 there was an outbreak of disease, which was regarded as influenza and pneumonia in Guadalupe, the next town to Socorro; 59 deaths occurred [the number of cases is not stated, but the total population was 6,300 only]. This outbreak ceased fairly abruptly and in Socorro in April–June there were 150 cases, 50 severe, and 100 mild; there were 34 deaths. In spite of *Aëdes aegypti* being numerous, infection did not spread to the districts surrounding Socorro.

The symptomatology in the severe cases was typical and autopsy revealed the usual signs of yellow fever; in the mild or abortive, the acute stage lasted only 24–36 hours, the chief symptoms being marked debility, shivering, rise of temperature to 39° C., severe pains in back and joints, intense headache, congested features, injected conjunctiva with subicteric tinge, pulse 100–120, vomiting and albuminuria. The blood of convalescents protected rhesus monkeys against infection with yellow fever virus, and efforts at mosquito control soon put an end to the outbreak. If the Guadalupe outbreak was not yellow fever, the origin of that in Socorro is obscure as no introduction could be traced, and the town is comparatively isolated; it is possibly an endemic centre. Attention is drawn to a condition known as *Neiva Fever*, which occurs in the Department of Huila and which the authors are inclined to think is yellow fever in the mild form.

H. H. S.

Kumm (Henry W.). **The Geographical Distribution of the Yellow Fever Vectors. A Compilation of Material recorded in the Literature, Unpublished Communications, and Certain Collections made by the Author in Nigeria, West Africa.**—*Amer. Jl. Hyg.* Monographic Series. 1931. July. No. 12. pp. iii+110. With 19 maps. [320 refs.]

A compilation which will be of value to all workers on this subject.

E. H.

Cumming (Hugh S.). **Present Day Problems of Yellow Fever.**—*Southern Med. Jl.* 1931. Oct. Vol. 24. No. 10. pp. 873–876. Also in *Public Health Rep.* 1931. Oct. 2. Vol. 46. No. 40. pp. 2361–2366.

A clear statement of the subject.

E. H.

Snijders (E. P.). **The Yellow Fever Problem in the Far East.**—*Far Eastern Assoc. Trop. Med. Trans. Eighth Congress, Bangkok, December 1930.* pp. 133–145.

A general account with special reference to the results obtained by the author in conjunction with Schüffner, Dinger and Swellengrebel.

E. H.

de Vogel (W.). Sur l'emploi de la souris blanche pour les recherches sur la fièvre jaune. [**The Use of White Mice in the Study of Yellow Fever.**]—*Bull. Office Internat. d'Hyg. Publique.* 1931. July. Vol. 23. No. 7. pp. 1210–1215. With 4 figs. on 1 plate.

Public Health Reports. 1931. Oct. 2. Vol. 46. No. 40. pp. 2366–2371.—**The Use of the White Mouse in Research on Yellow Fever. Experiments carried on at the Laboratory of Tropical Hygiene of the Colonial Institute of Amsterdam.**

An account of the experiments of Theiler [this *Bulletin*, Vol. 27, p. 872] and Dinger [*ibid*, Vol. 28, p. 722].

E. H.

Dinger (J. E.), Schueffner (W. A. P.) & Snijders (E. P.). Besmettingsproeven van caviae met gele koorts.—*Nederl. Tijdschr. v. Hyg., Microbiol. en Serol.* 1931. Vol. 6. No. 3. pp. 200–212. [3 refs.]

Lessa (Gustavo). A luta contra a febre amarella.—*Bol. Oficina Sanitaria Panamericana.* 1931. Aug. Vol. 10. No. 8. pp. 1103–1108.

Pettit (Auguste) & Stefanopoulo (Georges). Vaccination, sierotherapie et chimiotherapie contre la fièvre jaune.—*Giorn. d. Batter. e Immunol.* 1931. Oct. Vol. 7. No. 4. pp. 465–470. English summary. [Pasteur Inst., Paris.]

Public Health Reports. 1931. Nov. 13. Vol. 46. No. 46. pp. 2739–2740.—Influence of Temperature on the Infecting Power of *Aëdes aegypti* containing the Yellow Fever Virus. Note communicated to the Permanent Committee of the International Office of Public Hygiene, in its Session of May, 1931, by Dr. W. de Vogel, former Inspector in Chief of the Civil Medical Service of the Netherlands Indies, Delegate from the Netherlands Indies.

de Vogel (W.). Influence de la température sur le pouvoir infectant d'*Aëdes aegypti* contenant le virus amaril.—*Bull. Office Internat. d'Hyg. Publique.* 1931. July. Vol. 23. No. 7. pp. 1216–1217.

LEPTOSPIROSIS.

MULDER (J.), BONNE (C.) & SARDJITO (M.). Over de leptospirosen waargenomen in de Residentie Benkoelen. [**Leptospirosis in Benkoelen.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Oct. 1. Vol. 71. No. 13. pp. 1090–1137. With 20 text figs. & 3 figs. on 1 plate. [51 refs.] [Mijnbouw Mij Simau Hosp., & Path. Lab., Med. Univ., Batavia.]

Mulder recognized the Spirochaetosis febrilis (VERVOORT) as an endemic disease in Benkoelen (Sumatra). It occurs frequently in labourers of the mining company Simau, but is not restricted in its occurrence to the actual miners. Nothing is certain yet about the epidemiology, but further research in this respect (water samples, rats) is being performed.

The clinical picture as usual is a very variable one ; it is described in great detail and illustrated by a number of case reports and temperature charts. Mulder paid special attention to the cardiac and vascular symptoms ; auricular fibrillation may occur and possibly ventricular fibrillation is the cause of sudden death in some cases. In serious cases and such showing extrasystole the administration of quinidine is recommended. The lowering of the blood pressure without rise of the frequency of the pulse may cause the picture of " asthenic pulse." Jaundice is rather uncommon ; it was found in 8 per cent. of the well established cases. Conjunctival injection and the presence of leucocyte casts in the urine may be of diagnostic importance in the beginning of the disease. Certainty is only to be attained by bacteriological examination, i.e., by means of inoculation of guineapigs. Contrary to European experience the serological tests against various strains are much at variance.

W. J. Bais.

HIGUCHI (S.). Untersuchungen ueber das Toxin der *Spirochaeta* (*Leptospira*) *ictero-haemorrhagiae.* [**Studies on the Toxin of** *S. ictero-haemorrhagiae.*]—*Fukuoka-Ikwadaigaku-Zasshi.* 1931. Jan. Vol. 24. No. 1. [In Japanese. German summary p. 3.] [Faculty of Med., Kyushu Imperial Univ., Fukuoka, Japan.]

The author finds that guineapigs inoculated with a vaccine, prepared by drying *in vacuo* a culture of these spirochaetes, showed fever, hyperaemia of the conjunctiva bulbi, haemorrhages, and jaundice. These symptoms were not due to the presence of any living spirochaetes and are attributed to their toxins.

E. Hindle.

BAUER (Johannes H.). **The Survival of** *Leptospira icterohemorrhagiae* **in Old Cultures.**—*Amer. Jl. Trop. Med.* 1931. July. Vol. 11. No. 4. pp. 259–260. [1 ref.] [Labs. West African Yellow Fever Commission, Internat. Health Division, Rockefeller Foundation, Lagos, Nigeria.]

A culture of *Spirochaeta icterohaemorrhagiae* in Noguchi's serum agar medium left standing at room temperature (about 80° F.) in the dark

for 585 days was found to contain active leptospirae. Inoculation into guineapigs showed that the strain had become slightly attenuated, but its full virulence was recovered after five consecutive passages.

E. H.

THIRY (Urbain). Nouvelles recherches sur les Leptospires aquicoles. [**New Studies on Water Leptospirae.**]—*Arch. Internat. Méd. Expérim.* 1931. Oct. Vol. 6. No. 4. pp. 471–546. With 23 text figs. [41 refs.] [Inst. of Hyg. & Bact., Univ., Ghent.]

A useful summary of the author's observations on water leptospirae and especially on the susceptibility of mice to infection with strains occurring in the Ghent water supply [see this *Bulletin*, Vol. 28, p. 311.]

E. H.

LAVAU, RAGIOT, SOUCHARD, FARINAUD & LIEOU. Sur deux cas de fièvre ictéro-hémorragique observés en Cochinchine. [**Two Cases of Spirochaetal Jaundice in Cochin China.**]—*Bull. Soc. Path. Exot.* 1931. June 10. Vol. 24. No. 6. pp. 440–446. With 4 text figs. [Pasteur Inst., Saigon.]

An account of two typical cases of the disease, the first to be recorded from Cochin China, and the demonstration of the spirochaetes by inoculation into guineapigs.

E. H.

BESSEMANS (A.) & THIRY (U.). Réponse à MM Dinger et Verschaffelt à propos de leurs recherches expérimentales sur quelques souches de leptospires.—*Ann. Inst. Pasteur.* 1931. Oct. Vol. 47. No. 4. pp. 429–444. [9 refs.] [Inst. of Hyg. & Bact., Univ., Ghent.] [See this *Bulletin*, Vol. 28, p. 314.]

HIGUCHI (S.). Ueber die Infektionsversuch des Rattes für die *Spirochaeta* (*Leptospira*) *ictero-haemorrhagiae* und die Verteilung dieser *Spirochaeta* (*Leptospira*) im infizierten Rattenkörper sowie deren Ausscheidungsmasse. —*Fukuoka-Ikwadaigaku-Zasshi.* 1930. Dec. Vol. 23. No. 12. [In Japanese. German summary pp. 92–94.] [I. Med. Clinic, Kyushu Imperial Univ., Fukuoka, Japan.]

HIRSCH (Kurt). Die Kupferresistenz der Spirochäten vom Weil-Typ und Versuche ueber die Reinzüchtung von Wasserspirochäten auf Kupfernährböden. —*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 71. No. 5/6. pp. 459–472. [26 refs.] [Hyg. Inst., Univ., Freiburg i. Br.]

KITAOKA (Masami). Ueber ein neues Phänomen bei Wasserleptospirakultur. Eine Methode zur Reinkultur der Wasserleptospiren mittels dieses Phänomens.—*Zent. f. Bakt.* I. Abt. Orig. 1931. Oct. 1. Vol. 122. No. 4/5. pp. 314–318. With 1 text fig. [21 refs.] [Med. Clinic, Imperial Univ., Tokyo.]

DE LAVERGNE (V.), MASSON (P.) & STUMPF (R.). Réflexions sur l'étiologie de la spirochétose ictéro-hémorragique : origine murine. Transmission par l'eau.—*Rev. d' Hyg. et de Méd. Préventive.* 1931. Oct. Vol. 53. No. 10. pp. 721–730. [7 refs.]

DE LAVERGNE (V.) & STUMPF (R.). Parasitisme des rats de Nancy par *Spirochaeta ictero-hemorragiae*. Notion du parasitisme par "clan."—*C.R. Soc. Biol.* 1931. Oct. 12. Vol. 108. No. 27. pp. 69–70. [2 refs.]

SARDJITO. Untersuchungen ueber das biologische Verhalten verschiedener Stämme der *Spirochaeta icterogenes* (*Leptospira icterohaemorrhagiae*) und der *Spirochaeta pseudo-icterogenes* (*Leptospira pseudo-icterohaemorrhagiae*). —*Zent. f. Bakt.* I. Abt. Orig. 1931. Oct. 20. Vol. 122. No. 6/7. pp. 497–506. [6 refs.]

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

LE GAC. L'épidémie de fièvre récurrente au Ouadaï (Tchad), 1925–1928. [**The Epidemic of Relapsing Fever at Wadai (Chad Territory).**]—*Ann. de Méd. et de Pharm. Colon.* 1931. Jan.–Feb.–Mar. Vol. 29. No. 1. pp. 148–165. [4 refs.]

A further account of the great epidemic of relapsing fever in Central Africa during 1925–1928. Details are given of the cases occurring in Wadai and also notes on the parasitology and treatment. The spirochaetes (*S. recurrentis*) from the blood were inoculated into *Cercopithecus rubei* and *C. callitrichus* and produced a benign infection which rarely lasted more than five or six days. All attempts to infect *Cynocephalus* gave negative results. The blood formula of 14 cases of relapsing fever gave an average of polymorphonuclears 38·49 per cent., and mononuclears 61·49 per cent. The results of treatment showed that novarsenobenzol, sulphotreparsenan and acetylarsan were all satisfactory; but the use of atoxyl was often followed by relapses, and a bismuth salt, treposan, an oily suspension of bismuth succinate, was found to have no effect on the course of the infection.

E. Hindle.

MATHIS (C.). Les spirochétoses récurrentes en Afrique Occidentale française. [**Relapsing Fevers in French West Africa.**]—*Bull. Acad. Méd.* 1931. Oct. 13. Year 95. 3rd Ser. Vol. 106. No. 31. pp. 188–198.

A useful summary with a special account of relapsing fever at Dakar. The strain of *S. duttoni* in this region, originally found in a wild shrew mouse, and named *S. crocidurae*, has always been rather a problem, for in spite of its serological identity with the tick-transmitted *S. duttoni*, no one had succeeded in finding Ornithodorus or allied ticks in Senegal. Recently, however, Dr. DURIEUX has found specimens of *Ornithodorus erraticus* vel *marocanus* in an old house in the Isle of Gorée, and these ticks produced a spirochaetal infection in mice on which they were fed. This tick would seem to be the carrier of the Dakar race of *S. duttoni*, whose method of transmission thus falls into line with that of the spirochaete in other parts of Africa.

E. H.

MÁS DE AYALA (Isidro). Estudio clínico de la fiebre recurrente española (230 observaciones). [**Clinical Study of 230 Cases of Spanish Relapsing Fever.**]—*Medicina Países Cálidos.* Madrid. 1931. Sept. Vol. 4. No. 5. pp. 369–389. [Refs. in footnotes.]

An interesting study of 230 patients infected, for therapeutic purposes, by experimental inoculation with *Spirochaeta hispanica.* Various methods were used; 80 were inoculated intra- or subcutaneously or conjunctivally with the virus maintained by passage in rat or mouse, 20 by cultures, and 130 by direct transference from a human subject, subcutaneously, intramuscularly or intravenously. Patients were followed up, some for as long as three years, in order that late complications or sequelae, if they occurred, should not be overlooked.

Incubation period. This was found to vary with the number of spirochaetes inoculated and the route chosen. With cutaneous injection of 0·5–1 cc. of virus from the rat or mouse, it was 4–6 days, conjunctivally 6–10 days, with cultures 12–15 days. Direct transmission from patient to patient was followed by very short incubation, 1–2 days if from vein to vein, 2–4 days if subcutaneous or intramuscular. As a rule this period was symptomless, occasionally with anorexia, nausea and diffuse pains.

Onset was always abrupt with nausea, headache, chilliness, general malaise and a rise of temperature to 40° C., face and eyes congested, lips dry, pulse rapidity corresponding to the rise of temperature.

Attacks. The first usually persisted for 3–4 days, with the above symptoms together with drowsiness, prostration and rapid breathing, and in some splenomegaly. Temperature fell by crisis to 36° C. or even lower, occasionally with collapse which, however, responded to adrenalin. After 4 days' apyrexia the second attack occurred with similar symptoms, but usually less intense, lasting 3 days; then 4–6 days' interval, and a third still milder attack. After 4 attacks the disease seemed to come to an end spontaneously, though a few patients had a fifth, very short, attack of a few hours only. When following direct infection from a patient the first attack is usually more severe and subsequent attacks vary. The pulse rate during the accesses is between 120 and 140 per minute and in the intervals 60–80. Contrary to what is recorded in other forms of relapsing fever, the Spanish form does not cause anaemia, though there is a leucocytosis from 14,000 to 26,000 per cmm. in the attacks, falling to 4,000–7,000 in the apyrexial intervals. Labial herpes is not uncommon, and bile pigments in the urine; splenic enlargement, never very great, occurred after the first attack in about half the cases and enlargement of liver in 18 per cent.

Complications. In some 6 per cent. later attacks of fever, resembling the earlier ones, may occur from 15 days to 3 months after the usual "final" access, but no treatment is needed. Facial paresis to actual palsy was seen in 3 per cent., about 6 weeks after the fourth access, disappearing without treatment in 20–25 days. Iritis was found in 3 per cent. and cleared up entirely in 10–20 days.

Evolution and prognosis. Cure occurs spontaneously, usually after 4 attacks of fever, and the prognosis is always good. Infection could always be cut short by neosalvarsan, 0·45–0·6 gm. Spirochaetes are to be found in the peripheral blood a few hours before the attack of fever and though they are very greatly reduced shortly before the crisis they do *not* disappear altogether, and it is to the later multiplication of these few remaining serum-resistant spirochaetes that the relapses are believed to be due. The author states that they may be found even 1–2 months after the final access, but that their action is nullified by antibodies in the serum. Immunity persists for a year and in some patients even longer, after which reinoculation is successful.

Owing to the mildness of the fever, the invariable spontaneous cure and the ease of inoculation the author regards *Sp. hispanica* as the best agent for pyretotherapy. As regards the quantity employed for inoculation, he used 0·25 cc. of citrated blood from a rat or mouse, 0·3 cc. of emulsified culture. For man to man injection 15 cc. of blood is drawn into a syringe containing 5 cc. of 1 per cent. sodium citrate and injected between the scapulae; for direct vein to vein inoculation 2–3 cc. of blood is passed from a patient during a febrile access. This last always gave the best and most assured results. [The question of

alternation of strains in these experimental infections would form an interesting study, which is not referred to in the present article.]

H. H. S.

Clark (Herbert C.), Dunn (Lawrence H.) & Benavides (Joaquin). **Experimental Transmission to Man of a Relapsing Fever Spirochete in a Wild Monkey of Panama**—*Leontocebus geoffroyi* (**Pucheran**).—*Amer. Jl. Trop. Med.* 1931. July. Vol. 11. No. 4. pp. 243–257. [6 refs.] [Gorgas Memorial Lab., Panama.]

An interesting study of a spirochaete found occurring naturally in the blood of squirrel monkeys, *Leontocebus geoffroyi*, caught in the Republic of Panama, which seems to be identical with the spirochaete of Panama relapsing fever.

The infection was successfully transmitted to white mice, rats, a guineapig, white-faced monkeys (*Cebus capucinus imitator*), red spider monkeys (*Ateles geoffroyi*), a night monkey (*Aotus zonalis*), and to numerous other squirrel monkeys. It soon disappears from the blood in all these animals except mice, rats and young squirrel monkeys, the latter generally succumbing to the infection.

Two human volunteers were inoculated with blood from an infected monkey and both developed attacks of relapsing fever. From one case the infection was passed back into a clean squirrel monkey and from the other into three more volunteers, all of whom became infected, although one failed to show spirochaetes in the blood, in spite of a severe febrile reaction, but recovered promptly after an injection of neoarsphenamine.

Another man was infected by the bites of 31 nymphal and adult ticks, *Ornithodorus venezuelensis*, that had fed on an infected monkey about five weeks previously. This subject also failed to show spirochaetes, but a squirrel monkey inoculated with 1 cc. of his blood collected during the first febrile attack, showed spirochaetes 6 days later and died of the disease 31 days later. A batch of 60 larval ticks, that had been reared from adults fed on an infected monkey, were allowed to bite a human volunteer, who showed no signs of infection, either clinical or microscopic, during the succeeding five weeks he was under observation. Attempts were made to cultivate the spirochaetes in ascitic agar, and rabbit serum medium, but with negative results.

The authors also found spirochaetes in two opossums and two armadillos, and state that there is much to suggest that Panama relapsing fever is primarily a disease of animals rather than of man.

E. H.

Kritschewski (I. L.) & Dvolaitskaya-Barischewa (K. M.). *Ornithodorus papillipes* als Ueberträger von Spirochäten des Rückfallfiebers unter experimentellen Bedingungen. [*O. papillipes* **as the Carrier of Relapsing Fever Spirochaetes under Experimental Conditions.**]—*Zent. f. Bakt.* I. Abt. Orig. 1931. Aug. 11. Vol. 121. No. 7/8. pp. 421–432. [14 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

A detailed record of transmission experiments with *Ornithodorus papillipes*, the natural carrier of *Spirochaeta usbekistanica*, with various

other strains of relapsing fever. The results show that both *S. recurrentis* and *S. marocana* (Berbera strain) can be transmitted to white mice by the bites of this tick, in addition to *S. usbekistanica*. Experiments with the Brazzaville strain of *S. duttoni* gave negative results. It is of interest that the authors used only adult ticks in all their experiments and therefore their results with *recurrentis* and *marocana* do not agree with the views of Nicolle and his fellow-workers that Ornithodorus infected in the adult state do not transmit the infection by their bite, but have to become infected in the nymphal stage [see this *Bulletin*, Vol. 27, p. 109].

E. H.

Kritschewski (I. L.) & Brussin (A. M.). Ueber den Neurotropismus und die Salvarsanfestigkeit der Recurrensspirochäten. [**Neurotropism and Drug Resistance to Salvarsan in Relapsing Fever Spirochaetes.**]—*Arch. f. Dermat. u. Syph.* 1931. July 23. Vol. 163. No. 3. pp. 610–624. [32 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

Kolle (W.), Prigge (R.) & Rothermundt (M.). Erwiderung zur vorstehenden Arbeit von I. L. Kritschewski und A. M. Brussin. [**A Reply to the Foregoing Paper.**]—*Ibid.* p. 625.

The first of these is a polemical article in which the authors stress at some length their view that various races of relapsing fever spirochaetes show varying degrees of neurotropism or somatropism. Some races such as the African strains are found to be highly neurotropic, whilst others, such as the Russian strains, are highly somatropic and very little neurotropic. All strains of relapsing fever are said to be potentially resistant to salvarsan, but different strains show various degrees of this potentiality.

In reply, the German authors point out that many of the Russian strains show little tendency to produce residual brain infections, and most of these strains are not resistant against salvarsan. In opposition to the views of the Russian workers, they are of the opinion that the persistence of spirochaetes in the central nervous system depends essentially on the degree of antibody formation, and not on any inherent neurotropic or somatropic properties. Those interested should consult the original articles.

E. H.

Delanoë (P.). Le chacal et le hérisson réservoirs du spirochète marocain, *Sp. hispanicum* var. *marocanum* Nicolle et Anderson, 1928. [**The Jackal and Hedgehog as Reservoirs of the Moroccan Spirochaete.**]—*C.R. Acad. Sci.* 1931. Sept. 14. Vol. 193. No. 11. pp. 450–452. [5 refs.]

Out of 11 young jackals, 9 were found to be spontaneously infected with this spirochaete, whilst two adults were not infected. However the serum of one of these latter contained immune bodies against the spirochaete. The infections in three of the young jackals lasted from 15 to 20 days after they were caught. There was no persistence of the virus in the brain.

Out of 17 hedgehogs, 7 were spontaneously infected as shown only by subinoculation into guineapigs.

Another insectivore, *Macroscelides rozeti*, var. *deserti*, was examined, but the inoculation of blood and nervous matter from 15 of these animals into guineapigs gave only negative results.

E. H.

Rubinstein (P. L.) & Kapusto (M. L.). Ueber die Symbiose verschiedener Spirochätenarten des Rückfallfiebers und verschiedener Trypanosomenrassen bei Infektion. [**Mixed Infections of Various Species of Relapsing Fever Spirochaetes and of Races of Trypanosomes.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 72. No. 3/4. pp. 309–320. [6 refs.] [Microbiol. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

An interesting study of mixed infections of *S. recurrentis*, *S. duttoni*, *S. marocana*, and also of two strains of *Trypanosoma brucei* in mice. The results indicate that when mice are inoculated simultaneously with the above three strains of relapsing fever, a new race of spirochaete is obtained, with antigenic properties different from those of *S. recurrentis*, *S. duttoni* and *S. marocana* respectively. In all cases the adhesion phenomenon was used, and the spirochaetes of this new race gave negative results with immune sera of the three original strains. This race remained constant for six passages in mice, but on the seventh passage the three original strains reappeared.

This new race was not simply a mixture of spirochaetes for it was passed through mice immunized against each of the three original strains and retained its antigenic properties.

When two races of *Trypanosoma brucei* were similarly inoculated simultaneously into mice, it was found that in contrast with the results recorded above, that there was a suppression of one of the races and the other persisted unchanged.

E. H.

Levaditi (C.), Marie (A.) & Lépine (P.). Mécanisme de l'immunité dans la fièvre récurrente de l'homme. [**The Immunity Mechanism in Human Relapsing Fever.**]—*C.R. Soc. Biol.* 1931. Nov. 13. Vol. 108. No. 32. pp. 659–663. With 3 charts in text. [7 refs.]

The authors have treated four cases of general paralysis by the intracerebral inoculation of the Brazzaville strain of *Spirochaeta duttoni*. The patients all showed a continuous fever, which lasted for about a month, and there was no evidence of any relapses. The blood contained spirochaetes and the cerebrospinal fluid was also virulent 34 days after the inoculation in one patient, and 9 and 25 days afterwards in another. One patient died of an intercurrent pulmonary infection ; his brain showed signs of meningitis with large mononuclears, but no trace of spirochaetes, either *S. pallida* or *S. duttoni*. The other three patients all showed very marked improvement in their general condition, both physical and psychical.

Discussing these results the authors consider that the relapsing character of *S. duttoni* infection is due to two factors ; one the immunity acquired by the host and the other the antibody resistance acquired by the spirochaetes. This immunity must be under the control of the nervous system, since it does not develop if the nervous centres are affected, functionally and anatomically, by a local infection.

E. H.

KALAJEW (A. W.). Ueber die Natur der Immunität bei Rückfallfieber. XIV. Der Einfluss der Ausschaltung des retikulo-endothelialen Systems aus dem dem Organismus auf die Erreger des Rückfallfieber bei Ratten. [**Nature of Immunity in Relapsing Fever.**]—*Giorn. di Batteriol. e Immunol.* 1931. July. Vol. 7. No. 7. pp. 184–192. English summary.

KRITSCHEWSKI (I. L.) & RUBINSTEIN (P. L.). Ueber die Natur der Immunität bei Rückfallfieber. XV. Ueber die Bedeutung des Retikuloendothelialsystems als einer Abwehrvorrichtung während erworbener Immunität bei Rückfallfieber.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1931. Vol. 71. No. 3/4. pp. 372–382. [2 refs.] [Microbiol. Research Inst., Education Commissariat, Moscow.]

These two articles deal with continued research in Prof. Kritschewski's laboratory on the importance of the R.E. system in infections due to *S. duttoni*. (Previous abstracts, this *Bulletin*, 1928, Vol. 25, p. 406; 1929, Vol. 26, p. 420; 1930, Vol. 27, p. 577; 1931, Vol. 28, pp. 71, 854).

Kalajew finds that in the rat splenectomy leads to an enormous increase of spirochaetes in the peripheral blood-stream; in the terminal stages dense masses of organisms are visible with the low power of the microscope, a phenomenon hardly ever seen in the normal animal. As in the normal animal, destruction of spirochaetes occurs by lysis; phagocytosis is of minor importance. No lysis is seen in the brain tissues proper; he associates this finding with the absence of antibodies from the nervous system.

Kritschewski and Rubinstein study the protective functions of the R.E. in mice immune on account of a previous infection. Animals which 20 or 40 days previously had experienced not less than three relapses were subjected to splenectomy, with or without intensive blockade. On the day following splenectomy, and immediately after blockade, they were inoculated with a dose of spirochaetes many times the initial infecting dose. In no case did infection follow. As a more severe test the authors repeated the experiments with less highly immune mice, i.e., animals treated with salvarsan at earlier or later stages of the first attack. But now, in some cases, the second dose of spirochaetes by itself produced infection, and splenectomy, etc., had no greater influence in destroying resistance. At times splenectomy without reinfection also led to a relapse terminating fatally. Thus removal of a large part of the R.E. system does not abolish acquired immunity to *S. duttoni*. Either the immune animal is protected by some other cell system, or, after splenectomy combined with blockade, histiocytes not accessible to the investigator are sufficient to maintain immunity; the authors incline to the latter hypothesis.

E. Weston Hurst.

JAHNEL (Franz). Ueber das Verhalten der Geflügelspirochäten zum Zentralnervensystem. [**The Persistance of Fowl Spirochaetes in the Central Nervous System.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1931. Sept. 15. Vol. 112. No. 4. pp. 613–622. With 3 text figs. [12 refs.] [Kaiser Wilhelm Inst., Munich.]

It is well known that the fowl spirochaete can persist in the brains of fowls after their apparent recovery. The author injected infected fowls at

different stages of the disease with similar doses of neosalvarsan. Those injected when the spirochaetes first appeared in the circulation became completely negative, as tested by the inoculation into normal fowls of brain material, liver, spleen and blood, respectively. When birds were treated after the spirochaetes had become numerous they all showed residual brain infections. The author made sections of these brains and by using Jahnel's Pyridin-Uranium method was able to demonstrate the persistence of actual spirochaetes in both the white and gray substance of the brain.

E. H.

Landauer (E.). Etude du milieu dans lequel se cultive le spirochète des poules. [**A Study of Culture Media for the Fowl Spirochaete.**]—*C.R. Acad. Sci.* 1931. Aug. 3. Vol. 193. No. 5. pp. 301–302.

——. Sur la culture du spirochète des poules. [**The Culture of the Fowl Spirochaete.**]—*Ann. Inst. Pasteur.* 1931. Dec. Vol. 47. No. 6. pp. 667–679. [2 refs.]

The author, starting with Marchoux and Chorine's modification of Galloway's medium, after the tenth passage made further simplifications in the culture media without affecting the virulence of the spirochaetes, which at the 37th passage killed fowls in 5 days. As shown by Marchoux and Chorine 9 per cent. dilution of egg albumen in physiological saline solution, used in this medium, contains a harmful substance which disappears after heating at 80° C. for 30 minutes. The resulting liquid after centrifuging is favourable for the growth of the organisms. The author finds that even after the complete precipitation of all albumens by heating with alcohol or acid, the liquid obtained after filtration favours the growth of spirochaetes. Moreover the ash of egg white is equally efficacious.

Similarly blood, necessary in the earlier passages, was successfully replaced by the products of dialysis through a collodion membrane. Although the fowl spirochaetes only grow under a plug of vaseline, they die if completely deprived of oxygen.

E. H.

Le Chuiton. Etude sur les fièvres récurrentes à spirochètes. A propos d'un cas de fièvre espagnole constatée en Tunisie. [**Studies on Relapsing Fever. A Case of Spanish Relapsing Fever observed in Tunis.**]—*Arch. Méd. et Pharm. Nav.* 1931. July–Aug.–Sept. Vol. 121. No. 3. pp. 357–367. With 1 text fig. [4 refs.]

A full account of a case observed by the author in Tunis.

E. H.

Du (S. D.). **A Simple and Rapid Method of staining Blood Spirochetes.**—*China Med. Jl.* 1931. July. Vol. 45. No. 7. pp. 657–658.

The author recommends the use of carbol fuchsin for one minute, after dehaemoglobinizing for 5 seconds with 6 per cent. acetic in 95 per cent. alcohol.

E. H.

Panayotatou (Angelique). Quelques cas de bronchite à spirochètes de Castellani. [**Some Cases of Bronchial Spirochaetosis.**]—*Arch. Ital. Sci. Med. Colon.* 1931. July 1. Vol. 12. No. 7. pp. 384–390. English summary (6 lines).

A description of four cases diagnosed as bronchial spirochaetosis, observed in Alexandria, Egypt, which all showed chronic symptoms with

a tendency to relapse, and the presence of spirochaetes in the sputum. The use of stovarsol for treatment gave satisfactory results.

E. H.

Blanchard (M.). Les spirochétoses dans les problèmes d'hygiène coloniale.—*Marseille Méd.* 1931. May 25. Vol. 68. No. 15. pp. 653–668.

Hiroki (H.). A Contribution to the Understanding of Rieckenberg's Reaction on *Spirochaeta recurrentis*.—*Jl. Oriental Med.* 1931. Oct. Vol. 15. No. 4. [In Japanese. English summary p. 77.]

RAT-BITE FEVER.

Kuipers (F. C.). Mededeeling over nog een geval van rattebeetziekte. [**Another Case of Rat-Bite Fever.**]—*Nederl. Tijdschr. v. Geneesk.* 1931. Feb. 7. 75th Year. 1st Half. No. 6. pp. 604–607. With 1 fig.

Veen (H.). Rattebeetziekte (sodoku).—*Ibid.* pp. 608–613. With 1 fig. [8 refs.]

In the first communication there is described the third case in Northern Holland of rat-bite fever which has been observed by the author. The patient, a child, was bitten on the nose and hand. Two weeks later the child was suffering from fever, thickening of the nose and mucous discharge. The possibilities first considered were erysipelas of the face and diphtheria, but the true causation was established by the serum tests of lysis and agglutination. Blood culture was not successful. The child was treated by intramuscular injections of salvarsan—10, 20, 50 mgm. at weekly intervals and three of 75 mgm. at longer intervals. In spite of these, however, the temperature was more or less high for nearly 3 months.

In the second paper we have set out a very instructive case of primarily mistaken diagnosis. The patient had scratched his hand with a nail some 10 days previously, and appeared to be suffering from a consequent inflammatory reaction. It was not for some considerable time that the periodic character of the temperature curve and other symptoms, together with the discovery that the patient had been bitten by a rat, led to the diagnosis of rat-bite fever. This was confirmed by serum test. The symptoms of the patient before and after the diagnosis are fully described and the case is published more or less as a warning that such infection may be more frequent than is usually supposed.

W. F. Harvey.

de Araujo (Eduardo). Diagnostico experimental de sodoco. [**The Experimental Diagnosis of Sodoku.**]—*Brasil-Medico.* 1931. Oct. 3. Vol. 45. No. 40. pp. 924–928. English summary.

The author inoculated mice from a suspected case of sodoku in Brazil, and subsequently made blood passages into young guineapigs which all showed *Spirillum minus* in the blood.

E. Hindle.

MISCELLANEOUS.

COLONIE DU CONGO BELGE. Rapport sur l'Hygiène Publique pendant l'année 1929. [**The Public Health in Belgian Congo, 1929.**] [TROLLI (G.).]—164 pp. With 8 plates (1 map) & 1 chart. 1931. Brussels. [20 frs.]

This report, by Dr. TROLLI, Médecin en Chef, consists of 65 large pages of text, 84 pages of tables and reports from four laboratories. It cannot be adequately presented here. The number of doctors in the service is now 122. There are also 96 private practitioners, and 19 in the service of protestant missions. It is noted that young Belgian doctors are being recruited in increasing numbers, but that they are not interested in laboratory work.

Europeans.—Of the 25,679 there died during the year 285 or 11·09 per mille. This is the lowest figure since the formation of the Colony, but it is pointed out that improvement of transport has led to easier repatriation. This figure is compared with that of French and British colonies in Tropical Africa and it is seen that the mortality is intermediate, greater than the British but less than the French. The number of births was 517, the deaths in the first twelve months 92, an infant mortality rate of 178 ; this is an increase over previous years ; 34 per cent. of the European population are now women. The cause of death is known in less than half of the 285 deaths ; the list is headed by malaria and blackwater fever. 83 Europeans were invalided and 23 definitely declared unfit for service. The cause was in 19 cases malaria, in 12 anaemia, in 22 neurasthenia and in 3 debility.

Natives.—The table shows the number treated over a series of years and the deaths.

	Treated.	Deaths.	Per mille.
1925	238,351	3,399	14·26
1926	239,670	4,904	20·46
1927	251,428	4,583	18·22
1928	246,938	3,614	14·63
1929	362,946	4,422	12·18

An equal number has been treated by the great commercial companies, the Red Cross and missionaries. A table shows that in the Leopoldville Urban District with a population of 47,500 the deaths were headed by pneumonia (230), dysentery (78), and tuberculosis (81).

Passing on to diseases treated we find 3,850 cases of *variola* with 37 deaths, nearly all in the Congo-Kasai region. Of *yellow fever* there was no case. An epidemic of *plague* discovered in 1928 near Lake Albert on the Uganda frontier lasted through 1929. Of 60 cases, 7 were bubonic, 12 septicaemic and 33 pulmonary ; 8 were "undetermined." The cases occurred chiefly in the dry season when the nights were cold. No less than 200,000 rats have been captured ; it is not stated whether they were examined for evidence of plague. *Cerebrospinal meningitis*, which was formerly epidemic at the Kilo-Moto mines, is no longer found, which the author attributes to vaccination ; it still occurs elsewhere. Of *enteric fever* there were in natives

71 cases and 31 deaths, most of them in the Katanga province. A recent improvement in the figures is attributed to the inclusion of *Bact. paratyphosum C* in the vaccine used.

On the subject of *bacillary dysentery* the author writes that there is little of precision ; the origin of these cases does not seem to have been satisfactorily determined. Two diseases with unfamiliar names are mentioned, *fare* and *bitutu*. *Fare*, or *kaki*, which occurs in the Ubangi district in epidemic form, is an inflammation, sometimes ulcerous, of the terminal portion of the intestine, often fatal [? resembles bicho of S. America]. *Bitutu*, found in the Congo-Kasai province, is an acute eruptive fever in children, confused by the natives with smallpox. The fever lasts several days and the rash consists of miliary papules most abundant on the face.

Malaria. Government doctors treated 1,508 cases in Europeans with 12 deaths. Anaemia and neurasthenia, which are increasing in frequency, are in many instances due to malaria, and it is noted that these are the chief causes of invaliding. Figures are given also for natives. Of *blackwater* there were in Europeans 86 cases with 15 deaths.

Trypanosomiasis. On this disease there is a mass of detailed information. The number of Europeans treated was 21 against 12, 14 and 8 in 1928, 27 and 25 ; no death has occurred in this period [? in the Colony]. The vast extent of the problem in natives is seen in the statement that 2,383,892 natives were examined among whom 27,046 new and 50,244 old infections were found. No case of *T. rhodesiense* infection was diagnosed. The author pays a well-deserved tribute to the handful of doctors engaged in this work often under the most unfavourable conditions. Such good results as have been obtained in treatment are due largely to the general use of tryparsamide.

Tuberculosis. Since 1918 it has been obligatory on Europeans entering the colony to produce a medical certificate of freedom from this infection, and for Europeans developing infection therein to leave it. In this year there were 38 cases in Europeans and 471 in natives, of which 396 were pulmonary. All these diagnoses were made in persons attending hospital or dispensary.

Of *pneumonia* 4,356 cases were recorded with fatality ranging from 15 per cent. in the Oriental province to 34 in the Katanga, or for the whole 21·3 per cent. A vaccine is put out from the Leopoldville laboratory but there are no reports on its use.

Syphilis is increasing in the Oriental province both in Europeans and natives, especially along the Congo-Nile road ; 9,335 cases were recorded in natives. A few cases of general paralysis and other nervous complications are reported. Of *yaws* 88,930 cases were treated by the Government doctors. This disease must be declared and no charge is permitted to be made for the drugs employed in treatment. Few natives submit to complete courses. The Government doctors have treated 1,609 cases of *leprosy* and the Red Cross 1,016.

Relapsing fever. The distribution is mapped out in some detail. Relapsing fever and ornithodorus, the author writes, seem to be absent to the north of the 7th degree of S. latitude and between the 15th and 25th meridians. In one region of 5,022 persons examined 62 per cent. had *goitre*. In other regions the disease exists in less proportion. Iodized salt is being supplied to traders to be sold at the same price as ordinary salt, and in substitution for it. Among the natives there were 2,695 cases of *amoebic dysentery* with 225 deaths (8·3 per cent.),

39 of liver abscess and 106 " other forms " of hepatitis with 30 deaths ; what the nature of these last is the author does not know.

After a few remarks on ankylostomiasis which was reported to have caused 203 deaths in natives the author goes on to *bilharziasis* which appears to be increasing in the Colony. In Katanga it is according to VAN HOOF " un véritable fléau " ; it is both vesical and intestinal and is met with equally in the centres and in the bush ; 2,199 cases were reported, 984 from Katanga with 73 deaths. The author believes that *mental* and *nervous diseases* are increasing. In this year, trypanosomiasis excluded, there were 199 cases of insanity in natives, cerebral diseases 407, epilepsy 171, other nervous diseases 339. These cases occurred not in the villages, but at centres such is Leopoldville and Stanleyville. A case of *kala azar* was reported but, the author notes, without laboratory confirmation.

There are *schools for native assistants* at Boma, Leopoldville, Coquilhatville, Stanleyville and Elisabethville, the doings at which are briefly chronicled. Most are associated with laboratory or hospital. The author recommends the type which is independent and directed by a European of the medical service, who teaches the theoretical courses in a school *ad hoc* and looks after discipline of the pupils in a special " camp." He thinks the courses should be less theoretical and more practical than at present.

In a report drawn up in collaboration with Dr. REPETTO, Médecin hygiéniste inspecteur, the author says that we are not sufficiently informed on the real morbidity and mortality of labour in the Congo ; statistics and accurate reports are needed. The physical aptitude of the workers is at the root of the problem. We must know the proportion of fit and healthy men in the various tribes and in this connexion he discusses the Pignet index. A mission was to cover this field in 1930, to study the relation between variations in this index and the endemic diseases of different regions, and the various diets. We know nothing of the resistance of the black to fatigue and overstrain. Can he work 8 hours consecutively without training? Some companies have imposed rules of hygiene even stricter than those of the State. The author instances the Union Minière and cites its mortality figures over a series of years [given elsewhere]. The Médecin en Chef of that Company does not think that the mortality can be got below 20 per mille, but Dr. Trolli looks forward to a future record of 10 per mille.

A. G. B.

i. MOTTOULLE (L.). L'organisation du service médical et la situation sanitaire générale à l'Union Minière du Haut-Katanga fin 1929. [**Organization of Medical Service and the Hygiene of Union Minière du Haut-Katanga, 1929.**]—*Ann. Soc. Belge de Méd. Trop.* 1931. June 31. Vol. 11. No. 2. pp. 219–255. With 2 text figs.

ii. VAN NITSEN (R.). Notes sur la pathologie du noir dans les camps industriels de l'Union Minière du Haut-Katanga en 1930. [**Pathology of the Natives in the Industrial Camps of the Union Minière, 1930.**]—*Bruxelles-Méd.* 1931. Nov. 8 & 15. Vol. 11. Nos. 2 & 3. pp. 31–45 ; 67–75. With 2 figs. [18 refs.]

i. *Europeans*—This large mining company in the year under review had an average personnel of 3,484 Europeans—2,261 employees, 739 women and 485 children. The general mortality was 7·17 per mille ; for the preceding 3 years it was 8·9, 9·8, 7·8. The population, which in

the last year had increased by 1,000, is young and selected. As to disease, the most serious from all aspects were affections of the respiratory tract including influenza, malaria and affections of the digestive tract. The malarial incidence was 40·8 per cent. ; blackwater was seen 4 times. No amoebae, schistosoma or balantidium were seen in dysenteric stools, but a variety of bacilli which are named. Enteric fever has been almost eliminated by systematic vaccination with T.A.B. of all the personnel in, or proceeding to the Katanga. Since the appearance of paratyphoid C at the end of 1928 this bacillus has been included with the other strains in the vaccine. During the year 18 of the personnel were invalided home, 5 for psychical and mental symptoms.

Natives—The native employees numbered 17,257, of whom 11,440 were single and 5,817 married with 3,149 children. Besides these, there were 9,800 recruits undergoing " medical preparation " with 2,508 women and 1,318 children.

The table shows the mortality by diseases for three years.

TABLE III.

Mortality by disease among the Union Minière labourers of the industrial camps (accidents excluded).

Effective total : 17,257.

Disease.	Number of deaths.	Mortality per mille per annum.		
		1927.	1928.	1929.
Pneumococcus Infections	273	22·10	15·38	15·82
Typhoid fever ...	1	7·03	3·58	0·06
Paratyphoid " C " ...	1	—	0·20	0·06
Tuberculosis	11	1·30	1·37	0·64
Dysentery	37	5·67	3·65	2·14
Epidemic cerebrospinal meningitis	14	3·40	1·43	0·81
Bilharziasis	1	0·12	0·20	0·06
Variola	1	—	0·06	—
Miscellaneous ...	42	3·54	2·28	2·43
Total ...	381	43·16	28·15	22·02

The author does not think that the mortality figure can be reduced from the present 22·02 below 20 per mille. Pneumonia is still the principal factor ; it caused 67·9 per cent. of the total number of deaths. This percentage was in 1927 48·7 and in 1928 52·2 ; the progressive rise is due to the reduction of other causes of mortality such as enteric, meningitis and the dysenteries. The mortality among the 5,817 women was 17·02 per mille, also an improvement on past years, which shows, in the author's opinion, that the improvement is due not so much to amelioration of the conditions of work as that of housing, clothing and diet ; in women pneumonia, dysentery, tuberculosis head the list as causes of death. As regards the children there has been in all the camps since 1924 an *Oeuvre de Protection de l'Enfance Noire*, or O.P.E.N. Prior to that date the infant mortality reached 50 per cent. The O.P.E.N. reinforces the diet during pregnancy and suckling, treats chronic infections of the mother such as malaria, syphilis and

yaws, prevents V.D. by importation of families to diminish prostitution, and educates the mothers in the care of their children. Mothers and pregnant women in the camps have a special ration, a premium at birth and an outfit for the baby. All native women who are pregnant have a B.W. test and treatment if necessary. Table V is of interest as showing the steady increase in the number of married employees, and in the children born.

TABLE V.

Birth Rates Comparison by Years, Union Minière Camps.

	1924.	1925.	1926.	1927.	1928.	1929.
Effective average of labourers	12,111	13,849	13,275	15,476	15,345	17,257
Effective average of families	1,793	2,506	2,940	3,662	4,702	5,817
Percentage of families	14·80	18·10	22·15	24·66	30·64	33·71
Number of births per year (still-births included)	124	237	331	522	680	887
Births per 1,000 families per annum ...	69·2	94·6	112·6	142·5	144·6	152·5

The infant mortality seems to have been 315 per mille " which is not very different from that of the poor class in France in 1925."

As to the recruits in the special camps the mortality varied with the race, from nil in the Rhodesians to 45 per mille among the Ruanda-Urundi [actual figures not given] ; this race, however, once the period of " medical preparation " is over, is very resistant to climate and gives a good return of work. The most frequent causes of death amongst them are dysentery and paratyphoid C, both of which are being energetically combated.

The principal diseases of native employees are then discussed. The *pneumococcal group* is the most important, but ground is being gained by special measures of hygiene such as the suppression of common dormitories, the establishment of separate dwellings and the lessening of crowds for roll call and distribution of food. The mortality is now half what it was four years ago. The author notes that the mortality of volunteers from pneumonia is only a third of that of the recruits [again actual figures are not given], that the susceptibility varies with the tribe (Oriental province 39 per mille, Ruanda-Urundi 5 per mille), that women are less susceptible than men, and that " every old negro dies of pneumonia." The measures taken to decrease pneumonia are detailed ; many have already been mentioned.

Of *tuberculosis* there were 23 cases and 20 deaths. The author has not yet tried B.C.G. vaccine, " our native population being already submitted to so much vaccination of every kind." Amoebic dysentery is uncommon, schistosomal dysentery is more frequent, 156 cases. Of bacillary dysentery 8 groups of bacillary agents are listed (500 stool cultures) by far the commonest being " coli, paracoli and Friedlander." By far the majority of the sufferers are of the Ruanda-Urundi tribe. Fevers of the enteric group have rapidly diminished since the general use of antityphoid vaccine. The laboratory furnished in 1929 331,161 cc. of T.A.B.C. vaccine. The population is revaccinated yearly. Epidemic cerebrospinal meningitis is discussed, with tables. The author

concludes that antimeningococcus vaccination well carried out has the same prophylactic value as antityphoid or antivariola vaccination and that the complete extirpation of the infection should be aimed at. Tick fever is rare in the industrial camps, but more frequent in the camps of preparation; infection is especially acquired on the roads which lead from Rhodesia.

The incidence of *malaria* has risen, from 2,395 admitted to hospital in 1928 to 3,857; this rise is attributed to the Ruanda-Urundi. This tribe again harbours the greatest number and variety of worms; ankylostomiasis is the most frequent form but is rarely severe. Tropical ulcers have become rare; they are systematically sought for and every wound is dressed immediately; this is the duty of a native infirmier.

An account is given of the 8,952 examinations made in the laboratory and a list of the 16 vaccines and serums manufactured.

The medical service now consists of 95 Europeans, 28 of whom are medical men, and 900 natives; there are 19 hospitals with 1,500 beds.

ii. This paper covers the same ground, the statistics being for the following year. The author notes that in the last twenty years natives have been drawn to this corner of the Katanga from all over Tropical Africa, including N. Rhodesia, Nyasaland and Angola. They stay from 6 months to 3 years or longer. There are now 16,000. He claims that the organization of these camps has reached a degree of perfection rarely attained in the Tropics.

Malaria. The natives of Ruanda-Urundi are very susceptible; they get attacks comparable with those of Europeans. Cerebral forms are not rare and many cases of blackwater fever have been reported amongst them; LECLEF has described 9 seen in 7 months.* The author supposes that the form of malaria in Katanga is different from that in their own country [an explanation which seems inadequate]. Acclimatization takes three years. Antilarval measures against the mosquito vectors *A. costalis* and *A. funestus* are the only practicable means of prevention.

Pneumonia was, as always, the gravest affection. The small susceptibility of the Ruanda-Urundi natives was again noted. The Katanga climate differs little from their own, whereas to the Rhodesian and the Lomani native it is cold—a possible explanation. The author says that contracts of long duration, 3 years at least, would do more to lessen pneumonia than all the prophylactic measures known; it is mostly acquired in the first year. Discussing the influence of season he notes that at each introduction into a camp of a caravan of recruits the incidence of pneumonia rises. Preventive vaccination, begun in 1919, was discontinued except for the Rhodesians in 1924 and for them too in 1930. The author notes the differences of opinion in S. Africa on this subject.† Such measures as the distribution of warm clothing, hot food and drink in the work places, the obligatory notification of cases followed by disinfection of house and garments and, especially, the measures against overcrowding have, in the author's opinion, contributed largely to the diminution of pneumonia in the camps, but these measures will never extirpate it. The percentage of mortality goes down each year. In 1930 the incidence was 60·4 per mille, and the deaths 10·5 per mille of labourers.

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* *Bull. Méd. du Katanga.* 1931, No. 1, p. 19.

† See below, p. 241.

In spite of the great susceptibility of the black to *tuberculosis* the incidence in the camps goes down yearly. In this year there were 12 cases or 0·73 per 1,000 labourers. In 148 autopsies made in 1920–28 the organs were found affected thus :—

Lungs	118 times	Peritoneum	6 times
Spleen	36 ,,	Mesentery	3 ,,
Liver	30 ,,	Meninges	2 ,,
Intestines	23 ,,	Pancreas	2 ,,
Kidneys	14 ,,	Bladder	1 ,,
Pericardium ...	12 ,,		

In most instances several organs were attacked.

Under *intestinal affections* the author discusses the helminth infestations of the three tribes mentioned. In the Rhodesians the order of frequency is :

ankylostome, ascaris, strongyloides ; in the Congolese

ankylostome, strongyloides, trichuris ; in the Ruanda-Urundi

trichuris, ascaris, ankylostome [see this *Bulletin*, Vol. 28, pp. 763–4]. The author notes that carbon tetrachloride would be of value in the first two, but of questionable use for the Ruanda-Urundi.

The following measures were employed for *bacillary dysentery*—campaigns against flies with fly traps, systematic clearing round camps, preparation of food in a kitchen supervised by a European, common refectories, notification of cases followed by hospitalization and disinfection of dwellings and garments. The incidence of bacillary dysentery fell rapidly from 6 per cent. in June to 0 in December. [But this disappearance hardly bears the author's interpretation.] In 724 cultures from faeces there have been identified 49 times Shiga bacilli, 52 Flexner-Hiss-Y-Strong, 24 Kruse E (Sonne 3), 44 Morgan, and 91 Castellani (Salmonella asiaticus).

Amoebic dysentery is a rarity in the Lomami natives and the Rhodesians, but relatively frequent in the Ruanda-Urundi ; e.g., it was found 178 times in the last as against 5 each in the other two. All were imported cases. *Schistosomiasis* (mansoni) is frequent in natives with and without symptoms. This again is an imported disease. It is common in the Lomami (13·1 per cent.), rare in the Rhodesian (3·35 per cent.) and only exceptional in the Ruanda-Urundi (0·65 per cent.). [Unfortunately, figures of the actual numbers of the respective tribes are wanting.] Of 685 who were positive on examination only 185 had symptoms.

Grave ulcerative colitis of uncertain nature is found in the camps. It is perhaps a sequel of bacillary dysentery and the author notes that administration of antidysentery serum is often of benefit.

Enteric fever, which in 1926 and 1927 had affected 16 and 14 per mille of the labour force, in 1930 fell to nil, except a few cases in women and children, whom it is not possible to vaccinate as thoroughly. The fatality of this disease in the native is 40–60 per cent. The vaccine now consists of typhoid 1,000 millions, para A and B of each 250 millions, C 500 millions. Paratyphoid C, which was epidemic and severe among the Ruanda-Urundi in 1929, has now disappeared [see Lewillon, this *Bulletin*, Vol. 28, p. 42].

Of the eruptive fevers *measles* calls for some notice. This year 102 men, 97 women and 371 children had attacks, preceded by conjunctivitis. Twenty-three deaths occurred in children, or 6·2 per cent. Measles is a frequent cause of broncho-pneumonia and is a serious disease in the black child.

Tick fever (relapsing fever) is endemic in Katanga but, since the beaten earth of the huts was replaced by cement floors, has given little trouble.

Cerebrospinal meningitis was epidemic in 1925 (172 cases). All the population was then vaccinated with a vaccine prepared from local strains, and in 1930 5 cases only were reported. Vaccination is renewed yearly. The author, however, attributes the improvement to the hygienic measures taken rather than to vaccination.

Venereal Diseases. It is untrue, the author says, that *syphilis* is widespread in the Congo. In 1930 63 men, 91 women and 22 children were treated in the camps, i.e., 1·6 per 1,000 persons. There is no concealment. It is mild; the author has never seen visceral lesions or tabes or G.P. *Gonorrhoea* is common and more difficult to cure. *Yaws* is not a Katanga problem. It is found only in a few villages far from the camps. The cases treated are late cases which are not infective, mainly in adults.

The remainder of the paper is concerned with vital statistics. One notes that the general mortality of the native employees, 22·02 per mille in 1929, was this year reduced to 16·28.

A. G. B.

VAN CAMPENHOUT (J.). Considérations sur l'utilisation de la main-d'oeuvre au Congo Belge. [**The Employment of Labour in Belgian Congo.**]—*Bull. Office Internat. d' Hyg. Publique.* 1931. Sept. Vol. 23. No. 9. pp. 1627–1651. With 1 fig. [3 refs.]

On the question of the availability of labour in reference to distance the Congo Government authorizes the employment of 2·5 per cent. of the population for work at a distance and 3·75 per cent. for work on the spot, i.e., less than 6 kilometres away. Recruiting is performed by Labour Offices which follow the labourer through his career, recruiting him with medical selection, transporting him, acclimatizing and training him for work, exercising surveillance over him in his job, and finally sending him home or "stabilizing" him; these stages are schematically illustrated. The recruit has three medical examinations, one in his home or district, a second when he reaches his destination and a third when he passes to his employer. Various measurements and "indices" are discussed, for the guidance of the recruiting agents and doctors. Rules are laid down for the marches when transport cannot be obtained; 30 kilometres is given as the maximum distance for the day. Arrived at his destination the recruit is kept in camp for 14 to 28 days. For the first week he rests, has a copious diet, and a medical examination. Vaccination, jennerian, anti-enteric, anti-meningococcal, is begun, as well as an anthelminthic course. Exercises to improve the physique are practised in some camps. Before repatriation a medical visit is obligatory.

For sickness due to work and not to any fault of the employer compensation is given on a scale, without specific enquiry; such sums are usually squandered by the beneficiaries. The ration which was in force in Katanga up to 1930 is given; it consisted of manioc, maize or rice; bean or peas; ground nuts, oil or animal fat; vegetables or fruit; meat, fresh or chilled, or fish; and salt, and was equivalent to 4,050 calories daily. The present ration gives 3,545 calories. The mode of distribution of the ration is discussed. Vital statistics are given for the Katanga province, Congo-Kasai, Equator, and Eastern Provinces,

for 1927 to 1929, and the chief causes of mortality in the Katanga are discussed.

In support of the statement that the mortality is greatest in the first months we are told that of 244 deaths in the Katanga, 107 took place in the first 6 months, 94 in the 2nd 6 months, and 38 after a year. It is now proposed to recruit for a minimum period of 3 years, to facilitate marriage, give in whole or part the usual marriage gift, allow holidays, increase wages with period of service and provide comfortable quarters. As a result of an enquiry made by the Comité Consultatif de la Main d'Oeuvre Indigène the Committee recommends the recruitment of adult healthy men up to 10 per cent. and that in a total of 75 persons, women, children and infirm, there should be at least 23 men.

A. G. B.

DARDENNE. **The Red Cross in the Congo.**—*Rev. & Information Bull. League of Red Cross Soc.* 1931. July. Vol. 12. No. 7. pp. 235–239.

The Directress of the Congo Red Cross reports that in 1929 the Society expended nearly two million francs on medical relief to natives. It establishes hospitals and clinics, trains native nurses and midwives, provides popular health instruction and combats leprosy, venereal disease and tuberculosis. There are three medical units, each composed of a main hospital and dispensary with branch dispensaries at a distance of three days' march. They are situate in the Uele-Nepoko region of the Eastern Province where is a population of some 320,000. The best organized unit, formed in 1925 in Pawa, consists of two hospitals, for whites and natives respectively, a dispensary with laboratory for research, a maternity home, a tuberculosis village with 24 huts, a leper settlement with 160 huts, a school for native male and female nurses and a hostel for patients from a distance. The native hospital contains 45 beds. The monthly average of deliveries is 12–14. In the school for native male nurses there are 30; they live in, receive a monthly wage, wear Red Cross uniform, and remain for 3 years. Several "excel in microscopical work." Details are given of the campaign against leprosy; during 1930, 359 lepers were cared for and treated in the Pawa area.

There are also local committees in the chief towns. At Leopoldville an anti-venereal clinic has been opened for natives; in Katanga a leper settlement is maintained; at Wendji a dispensary and baby clinic.

The Congo Red Cross is to be congratulated on its activities.

A. G. B.

LASNET. Le programme de développement sanitaire aux colonies et les grands emprunts coloniaux. [**Program of Public Health Development in the French Colonies in reference to Colonial Loans.**] —*Rev. d' Hyg. et de Méd. Préventive.* 1931. July. Vol. 53. No. 7. pp. 481–502.

The French Parliament has approved the provision of large loans to the French Colonies, a percentage of which (457 million francs) is to be devoted to hygiene and public health. It was decided that no

public work should be commenced till measures had been taken to protect the health of the workers, and the Chamber voted 375 million francs for this purpose. Of this sum, 35 millions will be devoted to general measures and 340 millions to special or local measures. Among general measures are the organization of a mobile medical inspection of labour, the training of civilian doctors in a School to be created, enlargement of the School of colonial military medicine at Marseilles, subvention to the Institute of Hygiene of the Faculty of Medicine of Paris, subvention to the Institute of Colonial Medicine at Marseilles, creation at the Pasteur Institute, Paris, of a laboratory to be a centre of instruction and research in tropical medicine, subvention to the Institut Lannelongue for the training of visiting infirmières, creation of a colonial hospital at Marseilles ; 20 millions are to be provided for the last object. Details, too full to quote, are given of the local measures which are to be applied throughout the French colonies.

A. G. B.

HERMANT. Les maladies transmissibles observées dans les colonies françaises et territoires sous mandat pendant l'année 1928. [**Transmissible Diseases in the French Colonies and Mandated Territories in the Year 1928.**]—*Ann. de Méd. et de Pharm. Colon.* 1931. Jan.–Feb.–Mar. Vol. 29. No. 1. pp. 5–138. [1 ref.]

This long report, which reaches the public somewhat late, cannot be fully reviewed but some matters of interest are here noted :

Plague. In French West Africa of 707,136 persons 116,642 received lipo-vaccine. The people welcomed it and it has the advantage of needing only one administration. Its price is somewhat high and there are no data of its efficacy nor of the duration of the immunity conferred, but this is considered to be a few months. In Madagascar on the other hand an aqueous vaccine was used, 400,000 vaccinations.

Cholera. In Indo-China there were 4,440,884 vaccinations (agar cultures in saline heated to 57° C., two injections). The former desire of the population for this means of protection is now cooling, as is also the confidence which the sanitary personnel had in it. The systematic vaccination of bodies of persons under control—troops, schools, prisons—will be continued and eventually will provide a measure of its value.

Yellow Fever. In this year 3 cases only were reported on the Ivory Coast and 3 in Dahomey.

Typhus. This disease was reported for the first time in French West Africa from Upper Volta, the diagnosis being confirmed by a doctor with experience in North Africa. It was believed to have been imported by troops coming from Morocco.

Smallpox. Discussing vaccination the author notes that in regions where the total number of vaccinations has for some years exceeded that of the population, cases and even epidemics continue to arise ; this he attributes partly to reduced activity of the vaccine and partly to the fact that many revaccinations are of people who do not need it while the non-vaccinated escape.

Malaria. In Indo-China the government favours the use of quinine and supplies it at under cost price. Its sale is controlled, however, by the customs officials, the psychological effect of which is that the sale is hindered, for the people do not love the customs. *Cinchona ledgeriana* has been cultivated successfully in S. Annam since 1923.

The proportion of quinine in the bark reaches 10 per cent. and other varieties with bark rich in other alkaloids are equally successful. The author notes the freedom of New Caledonia from malaria; carriers of plasmodia are freely introduced and a complete entomological study of the mosquito fauna is advised.

Dysenteries. In Indo-China 9,700 cases were treated with 500 deaths. From the fact that the affection is almost always curable by emetine with arsenicals it is regarded as amoebic. Similarly in the French establishments in India the amoebic form is believed to prevail. The dysentery prevalent in Madagascar has been shown by THIROUX to be bacillary.

Sleeping Sickness. Full data are given from all the African colonies. The magnitude of the French problem is shown by the statement that in Cameroon of 752,000 inhabitants, 663,000 were examined and 115,000 or 17·4 per cent. found to be infected.

Relapsing Fever. This disease has almost disappeared from Indo-China where 20 years ago it produced murderous epidemics. In French Equatorial Africa it is decreasing in frequency.

Intestinal Parasites. The author contrasts the activity of the Anglo-Saxons, supported by the Rockefeller Foundation, against intestinal parasitism, especially hookworm and the slight attention paid to it in the French colonies. He describes and commends the methods of the International Health Division.

Phagedaenic Ulcer. The author realizes the enormous economic losses entailed in the tropics from this affection. The supply of boots, gaiters, etc., to natives whose work subjects them to small injuries is, he says, every bit as necessary as that of quinine and mosquito net in malarious regions. Its importance will not be realized till it is added to the list of occupational diseases and accidents.

Beriberi occurred almost exclusively in Cochin China among coolies imported from Annam or Tonking for the plantations. The cases have trebled since 1916 (988 and 3,425). The quality of rice has now been laid down by the Governor and improvement is expected.

Pneumonia. The severity and severe losses occasioned by the pneumococcus, especially in Africa are noted. Incidentally we learn that in several British Colonies in Melanesia the wearing of clothing covering the chest is interdicted.

Trachoma is found in Mauritania, in Upper Volta (1,199 cases), in French Sudan (2,578 cases). It is not reported from the other French African colonies suggesting that the disease decreases in incidence with distance from Northern Africa. The author notes that whereas the Sahara was formerly an absolute barrier it is ceasing to become so, and intercontamination is likely to follow.

Rabies. The French have always been to the front in the provision of antirabic institutes. They are Saigon (instituted 1890), Hanoi (1898), Hué (1912), Vientiane (1924) in Indo-China; Dakar (1913), Brazzaville (1926) in Africa, and a secondary centre at Bamako, which receives spinal cords from Dakar once a fortnight; Antananarivo in Madagascar. At Dakar 88 persons were treated in 1927, and 49 in 1928 (one from Nigeria).

Venereal Diseases. In Indo-China these take the second place in importance after malaria; figures are given. The practical absence of syphilis in New Caledonia and New Hebrides is compared with its similar absence in Fiji, Solomons, New Guinea, where the immunity is considered to be due to the wide distribution of yaws; and the question

is raised whether the complete treatment of yaws in the Pacific will not suppress or reduce this immunity.

Tuberculosis. Under this head figures are given of BCG vaccinations. These were as follows :—

Country.	1928.	In all.
Indo-China	27,187	70,788
Madagascar	2,169	3,848
French West Africa	721	1,980

Figures are given of subsequent histories but it is admitted that satisfactory evidence of benefit is not easy to obtain. Tuberculosis in French West Africa is partly due to infected native soldiers repatriated from France. Careful watch is now kept in France for early signs, the patient is promptly repatriated whatever the season, and whereas formerly the ultimate result was death, there is evidence from Guinea to the effect that some make a complete recovery, showing, as the author says, that for natives return to their homes is more efficacious than any form of treatment.

A. G. B.

Bauvallet (H.). Résultats d'une enquête démographique dans le Bas-Dahomey. [**Results of a Statistical Inquiry in Lower Dahomey.**]—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 604–608.

In order to obtain accurate figures of the births and infant mortality of the district the author interrogated 224 Yoruba women between 18 and 45 years who came to consult him for various reasons at Porto-Novo. All had an ardent desire to have children, because sterility entails repudiation or divorce. They were asked—How many living children have you? How many living children have you born? How many children born alive have you lost before they were 12 months old? There was no reason for concealment. The results are tabulated. The 224 women possessed 476 living children, or 2·12 per woman ; only 2 were sterile. They had born 620 or 2·76 per woman. Of the 144 children who were dead, 39 died in the first year ; the infantile mortality figure was therefore 62 per mille. This, as the author says, must be regarded as very satisfactory. The two chief causes of death of infants are intestinal parasitism and umbilical tetanus, both avoidable. The mothers are described as excellent ; they suckle their babies for 18 months. There is need for visiting infirmières to teach them cleanliness.

A. G. B.

Lefrou (G.). Comment déterminer l'âge des recrues en Afrique. Importance de la chronologie des dents de sagesse chez les Indigènes. [**Determination of the Age of Recruits in Africa. Eruption of Wisdom Teeth in Natives.**]—*Bull. Soc. Path. Exot.* 1931. July 8. Vol. 24. No. 7. pp. 595–604. [3 refs.]

When soldiers or labourers destined for work at a distance are recruited, it is necessary to select only adults who have completed their growth. At present a rough estimate of age is formed and the doctor

who afterwards takes them over has often to discharge many as too young and these may have a long journey to regain their own country. Adult age is reached when the epiphyses of the long bones join and this occurs in Europe at the age of 21. The eruption of the 3rd molars or wisdom teeth ought to coincide with the attainment of adult age, but racial characters differ. In whites the date of eruption is very variable, 10 per cent. of persons have only 28 teeth throughout life, and in nearly 20 per cent. the wisdom teeth are lacking in the lower jaw. In blacks on the other hand, the wisdom teeth erupt early, but the age has not been accurately determined. This difference is due to anatomical differences in the jaws of the races : moreover the third molar is larger in the negro than in the European, and has four cusps instead of three.

The author obtained data of recruits examined by the Council of Revision. Of 25 known to be 22 years and 33 known to be 21, only one had no wisdom teeth, whereas of 178 aged 20, 25 were without these teeth, 9 had one erupted, 26 had two, 19 had three and 99 four. Of the 25 without wisdom teeth 3 only were accepted for service, and this on grounds other than examination of the mouth. Of the 9 with one wisdom tooth, 3 were taken. The others were rejected for feebleness of constitution, or insufficient development. It follows that recruiting commissions should systematically refuse subjects without wisdom teeth.

Another table is given of the boys at the St. Louis schools the ages of whom are known, showing as before the number examined and the numbers with 4, 3, 2, 1 and 0 wisdom teeth for ages from 16 to 21. These accorded with expectation except at one school where these teeth had erupted in several boys at the reputed ages of 16 and 17. Here it was ascertained that to obtain admission a false declaration had been made and the real ages accorded with the teeth.

The author makes the following propositions :—

In the black the wisdom teeth erupt normally at 18–20 years, usually beginning with those of the lower jaw.

A native aged 16 has, as a rule, no wisdom teeth.

A native with 4 wisdom teeth is usually at least 18.

A native with no wisdom teeth is usually less than 21 and in half the cases less than 18.

Inspectors of labour have now a means of controlling the age of labourers.

[It should be easy to confirm or refute these observations.]

A. G. B.

KHARTOUM. **The Kitchener School of Medicine, Khartoum. Third Report, 1928-1930** [ATKEY (O. F. H.)].—73 pp. With 5 plates.

This consists of a résumé of the two previous reports [see this *Bulletin*, Vol. 24, p. 54 ; Vol. 25, p. 1004], report for the years 1928–29–30 and a number of appendices, chiefly assessors' reports on examinations. Dr. Atkey writes :—

" These three years have constituted a period of steady progress. Twelve additional students have graduated during this time, seven in 1928 and five in 1930.

" Thus nineteen Sudanese doctors are now carrying out medical work in the Sudan, fourteen as Sudanese medical officers and five as house-surgeons and house-physicians on probation. In every case they are carrying on work which was formerly carried on by Syrian medical officers.

" The positions of trust and respect that have been achieved by these Sudanese medical officers and the useful, honourable and prosperous careers which lie open before them have not failed to make an impression on the students at the Gordon College and, while during the years 1926 to 1929 some difficulty was encountered in getting the best type of student to enter the School of Medicine, there now seems to be little doubt that, in future, the most promising students will come forward for this work.

" The establishment of classes in Chemistry and Biology at the Gordon College in 1926 has been of great assistance in enabling a more thorough grounding to be given in these two most important subjects during the first year at the School of Medicine."

* * * *

" During the first two years the scheme and methods of teaching were, of necessity, largely experimental, but now a system of teaching has been developed that appears to be suitable to the nature and attainments of the students.

" The earlier students entered the school with no local tradition of conduct or work to guide them. It is believed that such a tradition is forming and that an atmosphere resulting from trust and confidence in their teachers and a realisation of the necessity for complete frankness and intellectual honesty is being established. This is indicated in the Assessors' report for 1930.

" The Assessors, in their report for 1927, recommend the establishment of a Graphic Museum similar to that existing at the Bureau of Tropical Research in Endsleigh Gardens."

* * * *

" The great difficulty experienced in teaching Arabs is to prevent verbal memorisation and to teach them to translate what they read into visual images. This comes so easily to a European child, who has looked at picture books since he was four years old, that it is very difficult for the European to realise to what extent an Arab is handicapped in this respect. The remedy is to teach more with the eyes and less with words and, for this reason, a Graphic Museum is essential for the proper tuition of Arabs. The Government is unable to undertake the construction and installation of such a museum at the present time, but it is hoped that some benefactor who is interested in this work will see his way to provide the necessary funds."

The Khartoum course lasts four years. The Assessors were asked whether a year should be added, to be spent in the study of Anatomy and Physiology, but replied that owing to the close individual attention made possible by the smallness of the classes such an additional year was unnecessary. This Report, which contains the Revised Syllabus, will be invaluable to the organizers of schools of medicine for natives elsewhere in the Tropics.

A. G. B.

FOLEY (H.). Mœurs et médecine des Touareg de l'Ahaggar. [**Notes on Customs and Medicine among the Touareg of the Ahaggar.**]—*Arch. Inst. Pasteur d'Algérie.* 1930. June. Vol. 8. No. 2. pp. 167–287. With 10 text figs., 57 figs. on 39 plates & 1 map. [16 refs.] [Pasteur Inst. of Algeria, Algiers.]

This interesting and well illustrated monograph treats of the natives of a mountainous region of the Southern Sahara at about 23 N. latitude. The scientific mission of which the author formed part left Algiers February 16th, reached Tamanraset on March 5th, left Amegid on April 28th and reached Algiers by a different route on May 14th. They studied, as far as their means allowed, the pathology and

parasitology of the inhabitants. The chief subjects of medical interest discussed are malaria (no evidence of its presence), bronchitis, tuberculosis (von Pirquet reactions showed an infection rate of 33 per cent.), trachoma (general, a discrete form), syphilis (especially a naso-pharyngeal form), gonorrhoea, intestinal parasites (one out of 15 harboured ova of *Hymenolepis nana*; in stations to the north Ascaris was common); tinea (22 per cent. of 127 children had trichophyton or favus). The author collected an Ornithodorus which is described here as *O. foleyi* and which bites camels, zebus, goats and occasionally man, *Phlebotomus sergenti*, *Anopheles hispaniola* and *Theobaldia longiareolata*.

A. G. B.

India. **Annual Report of the Public Health Commissioner with the Government of India for 1928. Volume I. With Appendices.** [Graham (J. D.).]—Section X. Jails of India. pp. 264–277.

The average jail population during 1928 was 135,494 (decennial mean 1918–27; 126,280). The constantly sick rate was 21, as in 1927, the lowest on record for 25 years. The admission to hospital rate was 513·3; this was the lowest on record for 30 years. The death rate, 12·94 was also the lowest recorded.

The principal recorded causes of sickness were malaria (127·8), abscess, ulcer and boil (37·0), respiratory diseases (26·6), dysentery (24·8), influenza (24·1), diarrhoea (16·7), pneumonia (10·5), tubercle of the lungs (7·8), anaemia and debility (6·8) and pyrexia of uncertain origin (5·0).

The principal causes of death were, tubercle of the lungs (2·64), pneumonia (2·24), dysentery (1·40), malaria (0·60), respiratory diseases (0·53), enteric fever (0·36), anaemia and debility (0·32), diarrhoea (0·27) and influenza (0·23).

Data are given of these and other diseases at the several jails. Of malaria there were 17,319 admissions and 81 deaths; of pneumonia 1,419 admissions and 303 deaths; of tuberculosis of the lungs 1,039 admissions and 353 deaths. There follow a table showing the gains or losses of weight on discharge from the jails of the eleven provinces, and special remarks on each province.

The Section concludes thus :—

"This résumé of dry facts regarding the vital statistics of the Indian jails during 1928 cannot but impress the reader who studies it carefully with the steady trend of improvement in health conditions which is taking place almost everywhere. A constantly sick rate (21) below the decennial mean in all the provinces, and the lowest on record; an admission rate (515 per mille)—the lowest for 30 years; a death rate, the lowest on record; an absence of any serious epidemic, despite the prevalence of such in the jail environs, all speak for themselves. As I have indicated in previous annual notes they demonstrate in unmistakable terms how well served the various provinces are by their jail medical superintendents."

A. G. B.

Calcutta. **Eighth Conference of Medical Research Workers held at the School of Tropical Medicine, Calcutta, from 17th to 22nd November 1930** [Graham (J. D.), Secretary].—pp. ii+179. 1931. Simla: Govt. of India Press.

The Medical Research Workers who are sustained by the India Research Fund Association meet annually to discuss their programmes

of research, to allot funds and for other business. The Report consists of the Agenda, list of 55 delegates (from the Government of India (15), the Army Department and eight Provinces (25 from Bengal)), a résumé of the proceedings on each day, and 41 appendices. Major-General MEGAW was chairman and Major-General Graham secretary of the Conference. In his opening statement General Megaw said that there were 73 research workers in the pay of the I.R.F.A., 23 of whom are Europeans and 50 Indians. On this occasion the subjects of cholera, malaria, kala azar, rabies and plague were referred to Committees.

The All-India Institute of Hygiene and Public Health is under construction and it is hoped that it will be ready by January 1st, 1932. The immediate creation of a new Central Medical Research Institute is suspended and in the " present financial embarrassment " it is unlikely to materialize for some years. A proposal for an enquiry into respiratory diseases provoked a lively discussion ; though the importance of the subject was recognized by all objections were raised on various grounds. It was agreed however that such an enquiry should be taken up as soon as possible and should be considered at the next meeting of the Conference.

Of the resolutions placed before the Conference and passed unanimously the following is of general interest :—

" The Conference resolved that a Cholera Commission should be formed to undertake investigation and study of the whole subject of cholera in India. This should consist of a Director and at least three Assistant Directors. At its headquarters will be constituted a Cholera Bureau and a main laboratory. The location might be at any suitable locality in India, the necessary arrangements for a laboratory and a Bureau being made provisionally in such accommodation as may be available. It should also have field laboratories at such localities as may from time to time be decided on by the Director, Patna however being retained, to start with, as a base for work on bacteriophage.

" This Commission should be appointed for five years in the first place, and the Director should work towards the establishment of a good organization of a semi-permanent kind, having in view the probability that research into cholera in India would in any case last for some years and require eventually a systematized epidemiological enquiry in many parts of the country.

" This Commission would work in very close touch with the Directors of Public Health of the Provinces.

" It was considered that a sum of two lakhs of rupees should be budgeted for the purpose of this Cholera Commission during the next financial year, this to include all enquiries on the subject of cholera bacteriophage."

The bulk of the Report is occupied by the Appendices, which will repay study by those who wish to know what research work is being carried on in India.

A. G. B.

FAUST (Ernest Carroll). **China's Contribution to Tropical Medicine.**—*Jl. Trop. Med. & Hyg.* 1931. June 1. Vol. 34. No. 11. pp. 145–146.

Of Chinese diseases malaria alone is known to have been prevalent in Ancient China ; the symptoms of ague were described in Chinese medical annals as far back as B.C. 2600. It is suggested that bubonic plague was introduced into Yunnan from north-east India, pneumonic plague from Mongolia, typhus and relapsing fever from the same country,

cholera by way of ships from India and dengue in the same fashion from Malaya. Syphilis was known as early as the seventh century, when mercury was prescribed for its cure. The Jesuits, Marco Polo and the Portuguese explorers made no medical contribution, nor did the British East India Company which traded between Canton and Hong Kong. MANSON was the first to enrich China and the world with medical discoveries. His activities are here sketched. For 15 years after MANSON'S departure (1889) no work on tropical diseases issued from China though in India and Africa much was doing. Recent activity begins with LOGAN'S discovery of *Schistosoma japonica* in Central South China and goes on to the research programme of the China Medical Missionary Association (1907). More recent events will be familiar to readers. The author notes that in the last decade many young Chinese physicians have been trained and are now actively engaged in research.

A. G. B.

MUMFORD (R. H.). **Out Patient Work on One of the Pescadore Islands.**—*China Med. Jl.* 1931. Aug. Vol. 45. No. 8. pp. 737–742. [3 refs.]

An account of a visit to one of the Pescadores, which lie between Formosa and the mainland of China. The island is 3 by 2 miles, and often cut off by rough seas from Formosa. It is treeless and wind swept; with crops protected by stone walls. Most of the 3,200 inhabitants are fishermen. The women and children cultivate maize, green vegetables and sweet potatoes and raise fowls. 220 patients were seen. The chief diseases were of the eye. An islander with a pair of perfectly sound eyes is exceptional. Many were blind in one or both. Diseases seen were glaucoma, chronic keratitis, trichiasis, entropion, cataract, pterygium, and a mixture of these conditions.

A. G. B.

HUDSON (Ellis H.) & YOUNG (Agnes L.). **Medical and Surgical Practice on the Euphrates River. An Analysis of Two Thousand Consecutive Cases at Deir-Ez-Zor, Syria.**—*Amer. Jl. Trop. Med.* 1931. July. Vol. 11. No. 4. pp. 297–310. [7 refs.]

Deir-ez-Zor is situated on the Euphrates 300 miles north-east of Damascus. With a population of 25,000 it is a trade centre for nearly half a million. Of the 2,000 patients, 57 per cent. were males. Rickets was noted in 26 children, all extreme cases. Tuberculosis is a serious problem; 168 cases were seen with 48 positively diagnosed pulmonary cases; the spine, bones and joints came next in frequency. There were 4 cases of typhoid and 2 of paratyphoid A, a small number in view of the prevalent insanitary habits. Of syphilis there were 319 cases, men and women about equal. It has predilection for the skin, lymph nodes and bones, the viscera escape serious damage and nerve syphilis is practically absent. It is not here a venereal disease and is so common that it is considered universal. It is chiefly a childhood exanthem. When volunteers were called for for blood transfusion, of 13 presumably healthy persons who presented themselves as donors, 6 had a

positive Kahn reaction. The similarities with yaws are noted [see this *Bulletin*, Vol. 26, p. 177, HUDSON].

There were 27 cases of malaria, only 2 of them in children ; the disease is not indigenous. No indigenous case of leishmaniasis was seen, which is attributed to the " scarcity of insect life." The greatest single source of acute illness was amoebic dysentery, for which the housefly, present everywhere in swarms, is held largely responsible ; 144 cases were noted. Defaecation is promiscuous ; the meat and vegetable market is littered with faecal deposits ; the disease is of the house rather than the tent. Ova of *Taenia saginata* were found in 42 stools and of *Hymenolepis nana* in 8, ascaris ova in 94 and ankylostome ova in 28. There were 23 cases of lobar pneumonia and 50 of broncho-pneumonia in children. They were struck by the paucity of cases of disease of the circulatory system. A table shows the systolic blood pressure findings in 1,056 adults. With the pressure plotted in multiples of ten, half had pressures of 100 and 110 mm. Hg. The number of conjunctivitis cases is not given, but of smears of conjunctival discharge 107 showed the Morax-Axenfeld bacillus, 94 the pneumococcus, 45 diplococcus, 31 Koch-Weeks bacillus and 15 gonococcus. Trachoma and trichiasis were common. Diseases not encountered were —diphtheria, cholera, erysipelas, tetanus, anthrax, undulant fever, plague and leprosy.

In their " discussion and summary " the authors note that almost 50 per cent. of the illnesses have a definite public health aspect. The diseases of trachoma, tuberculosis, amoebic dysentery and syphilis " merit direct attack from the standpoint of community education and treatment."

A. G. B.

RUGE (Reinhold). Die Einbeziehung der Tropenkrankheiten in die Unfallversicherung. [**The Inclusion of Tropical Diseases in Insurance against Accidents.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. June. Vol. 35. No. 6. pp. 323–331.

This paper owes its origin to the extension of the German State insurance scheme to the industrial diseases of seamen. It is first of all necessary to understand what is meant by Tropical and then by Tropical Diseases. Setting aside the Tropics proper one may follow SUPAN, who regarded that part of the earth's surface which lies between the isotherms of 20° C. as hot country, or WAGNER, who included as subtropics that part of the temperate zone which is characterized by winter rain and summer drought, which adds a large area to SUPAN's zone. In a publication of the German Government, Tropical Diseases are defined as " all infectious and parasitic diseases peculiar to the tropics and subtropics," which omits diseases of toxic origin and heatstroke as well as malaria and others. A more liberal definition is that of H. RUGE : Tropical diseases are illnesses which are indigenous to warm countries or chiefly occur there.

The author reaches the conclusion that for the purpose of the German " Verordnung " definitions are required of hot country, tropical diseases, and which of these are to be regarded as " accidents " and that such definitions must be furnished respectively by the meteorologist, the physician and the jurist.

A. G. B.

Reed (Alfred C.). **Organized Tropical Medicine in the Western United States.**—*California & Western Med.* 1931. Sept. Vol. 35. No. 3. pp. 185–188. [Pacific Inst. of Trop. Med., Univ. of California, Berkeley.]

Deals with the establishment on the Pacific coast of U.S.A. of the Pacific Institute of Tropical Medicine, a division of the Hooper Foundation for Medical Research of the University of California. It is to be educational, giving six-week courses in tropical medicine, to conduct research and to care for patients.

A. G. B.

Macaulay (T. S.). **European Recruits for the Tropics.**—*Jl. Trop. Med. & Hyg.* 1931. Aug. 1. Vol. 34. No. 15. pp. 237–238.

The author, who is a medical officer for rubber estates in Malaya, is dissatisfied with the medical examinations which young Europeans undergo at home, and gives case details of employees who, for reasons of health or temperament, proved unfit for tropical life.

A. G. B.

Edge (P. Granville). **The Scope and Uses of Vital Records in the Tropics.**—*Proc. Roy. Soc. Med.* 1931. July. Vol. 24. No. 9. pp. 1269–1277 (Sect. Trop. Dis. & Parasit. pp. 35–43). With 1 fig. [5 refs.] [Summary appears also in *Bulletin of Hygiene.*]

In civilized countries vital statistics are recognized as essential adjuncts of public health work, as evidence both of the success of such work and the directions in which further preventive measures are required. For various reasons the statistics available from many of our tropical dependencies are entirely valueless. Such records of considerable accuracy and value could, and should, be obtained by degrees. As a beginning, small scale inquiries should be persistently and regularly made. For small areas it should be possible to obtain accurate population figures, by sex and civil state and approximate ages, births and infant mortality-rates, death-rates and their causal and seasonal variations. By such means, too, the native peoples would become familiar with the details such inquiries entail, the frequent visits of officials come to be regarded as matters of mere routine, and any suspicions aroused during the early stages would gradually disappear. It would be only a matter of time before the area and scope could be extended. The Dutch have made a wide range of epidemiological studies discussing a variety of health problems peculiar to the tropics, and there is no reason to suppose that similar work is impossible in English dependencies.

A. B. Hill.

Office International d'Hygiène Publique. Comité Permanent de l'Office International d'Hygiène Publique: Session Ordinaire d'Octobre, 1931. [**Standing Committee of the Office International: Session of October, 1931.**]—21 pp. [3 refs.] 1931. Paris: Office Internat. d'Hyg. Pub., 195, Boulevard Saint-Germain.

The topics considered by this Committee are numerous and varied. A few will here be noticed.

The Pilgrimage Committee sat with the main Committee to examine a report on the Mussulman pilgrimage of 1931. It is noted that instead of 120,000 pilgrims, there were this year only 64,000. North Africa and

Persia furnished hardly any; the cause is believed to be the general economic depression. There were few cases of malaria and dysentery, and none of cholera; 4 healthy carriers of agglutinable vibrios were taken off at El Tor. Though the majority of pilgrim ships are well found there are some which are defective and should not be licensed.

Other questions related to the application of the International Sanitary Convention of 1926, especially the periodic deratization of ships. The Committee is considering the rules in force in different countries concerning the transport of bodies in coffins, with a view to their co-ordination. After a section on the drugs of addiction we come to the infectious diseases. Interrogations addressed to four countries on anti-plague vaccination brought replies both for and against its efficiency. The subject is discussed and it is noted that the Indian replies were in favour and that in that country vaccination was popular. It is observed that the methods of preparation of the vaccine are not uniform. The details of the deratization of ships are discussed. An epidemic of cholera in Iraq is compared with another in Shanghai. In the first the fatality was 60 per cent.; in the second 8–16 per cent.

Of yellow fever it is noted that the zones of endemicity are now being delimited. Observations in Belgian Congo showed that *Ae. aegypti* can be transported in aeroplanes between the chief centres in that country. Four positive results are recorded [without details], but it is stated that when the flight had exceeded 1,700 metres in altitude the mosquitoes were dead. These experiments, says the writer, must be repeated with greater precautions. [For similar experiments made in southern U.S.A. see *Pub. Health Rep.* 1931, Vol. 46, p. 2775.] Other diseases discussed are haemorrhagic icterus, eruptive fever in Rumania, encephalitis, tuberculosis, undulant fever, trachoma.

A. G. B.

Orr (J. B.) & Gilks (J. L.). **Studies of Nutrition. The Physique of Two African Tribes.**—*Med. Res. Council Spec. Rep. Ser. No. 155.* 82 pp. With 11 folding graphs. 1931. London: H.M.S.O. [2s.] [Review appears also in *Bulletin of Hygiene.*]

This report records preliminary observations on the physique and susceptibility to disease of two East African tribes, with special reference to the possible relation of nutritional factors to physical development and predisposition to disease. The Akikuyu were chosen as an example of a vegetarian tribe, their food consisting largely of maize and millet with roots and fruit, while the Masai represented a meat-eating race, their diet containing large quantities of meat, milk and blood. Studies were made of the average physique of the two tribes and of their growth rates during childhood. The incidence of diseases among the two groups was investigated by examining hospital records and by a personal survey of a large number of natives. The adult Masai male was 5 inches taller and 23 lb. heavier than the adult Kikuyu and his muscular strength was 50 per cent. greater; it was not possible to determine the respective influences of heredity and nutritional factors on these differences in physique. Bone deformities, dental defects and anaemia were much commoner among the Kikuyu children than among the Masai children; there was no significant difference in the distribution of enlarged tonsils in the two tribes. Respiratory diseases and tropical ulcer accounted for most of the sickness met with among the

Akikuyu, whereas the Masai suffered chiefly from constipation and arthritis. The special features of the Kikuyu diets were a superabundance of cereal and a deficiency of calcium ; the serum calcium of these men was low and it could be increased by adding to the diet either calcium salts, cod-liver oil or milk. An attempt was made to correlate the occurrence of tropical ulcer with dietetic deficiencies by following the rate of healing of established ulcers in hospital when various supplements were added to the patients' diets. The ulcers gradually healed as the general condition of the patients improved, but no single dietary constituent that was tried (e.g., milk, cod-liver oil, tomatoes, mineral salts) exerted an obvious healing influence.

Although the investigation was admittedly incomplete the results lend support to the view that ill-balanced diets may be responsible to a considerable extent for the loss of health and efficiency among the natives which hampers the development of many districts in our tropical dependencies.

S. J. Cowell.

Mason (Eleanor D.) & Benedict (Francis G.). **The Basal Metabolism of South Indian Women.**—*Indian Jl. Med. Res.* 1931. July. Vol. 19. No. 1. pp. 75–98. With 1 text fig. [Refs. in footnotes.] [Women's Christian College, Madras, & Nutrition Lab. of the Carnegie Inst. of Washington, Boston.]

The basal metabolism of 54 native women (Tamils, Malayalis, Telugus, Coorgs and Kanarese) in South India, of ages from 17 to 31 years, was measured by the Benedict portable apparatus. No significant differences between the various groups of Indians were found in the measurements, but these are lower than in Westerners. The average percentage deviation of the basal heat production from the Harris-Benedict standards is −16·9 per cent. with variations of from −5·3 to −33·0 per cent. From the Aub and Dubois standards the average deviation is −17·2 per cent. with extremes of −4·6 and −28·7 per cent. Possible causes of this deviation are : (1) low protein metabolism ; (2) tropical conditions of climate ; and (3) a state of relaxation during repose as complete as that which is found during sleep among Westerners. Reference is also made to the evidence which suggests that there is a definite racial factor which in part accounts for part of the difference.

M. E. Delafield.

Mukherjee (Harendra Nath) & Gupta (Pratul Chandra). **The Basal Metabolism of Indians (Bengalis).**—*Indian Jl. Med. Res.* 1931. Jan. Vol. 18. No. 3. pp. 807–812. [34 refs.] [Carmichael Med. College, Calcutta.]

The basal metabolism of eighteen normal healthy Bengali young men between the ages of 20 to 29 was studied. The determinations were done with the Douglas bag and the Haldane gas analysis apparatus. On the average the basal metabolism is 13·3 per cent. below the Aub and Dubois standard. The relationship between vital capacity and area of the body surface is 14·8 per cent. below normal Western standards. Pulse pressure is also lower, judged on the same standards.

M. E. Delafield.

Banerji (Niant Dhan). **Basal Metabolism of the Prisoners of the District Jail, Lucknow (United Provinces of Agra and Oudh).**—*Indian Jl. Med. Res.* 1931. July. Vol. 19. No. 1. pp. 229–238. With 4 graphs & 1 plate. [8 refs.]

Using the "British Benedict portable metabolism apparatus closed circuit type" the basal metabolism of 145 prisoners, Hindus and Mohammedans was determined. The average deviation from European standards was −6·9 per cent. High atmospheric temperature with a high degree of humidity are suggested to be the most important factors which go to lower the basal metabolic rate of Indians in India.

M. E. Delafield.

Radsma (W.). De ruststofwisseling bij den Europeaan in de tropen.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Jan. 1. Vol. 71. No. 1. pp. 6–29. [11 refs.]

——. **Metabolism during Rest of the European in the Tropics.**—*Arch. Néerlandaises de Physiol. de l'Homme et des Animaux.* 1931. Mar. Vol. 16. No. 1. pp. 91–122. [18 refs.] [Lab. of Physiol. Chem., Med. Univ., Batavia, D. E. I.]

The apparatus used in this research was that of Knipping, but the Douglas bag was also employed in a few instances. The subjects of the experiments were European students, nearly all between 20 and 23 years of age, and about 50 were examined. It is claimed that "the number of our subjects is sufficiently large to enable us, without any further statistical calculation, to draw one conclusion at least for this age category, that basal metabolism with Europeans in the tropics is reduced, at least that it is lower than the standard figures prevailing for that in Europe and America." The actual differences found were:

(1) *Group* 1. 8 persons with residence of about 3 months in the tropics, examined after 1 hour's rest in bed the average was −10·57 per cent. Benedict. All in this group were below the normal figure.

(2) *Group* 2. 7 persons, with residence of about 1 year in the tropics, examined after ½ hour's rest the average was −4·3 per cent. Benedict. One in this group was, however, +9·6 per cent.

(3) *Group* 3. 26 persons, with residence of 2 years or more in the tropics, examined after ½ hour's rest the average was −3·01 per cent. Benedict. Seven of the group were above the Benedict normal.

No explanation of the difference is suggested, but among possible causes are climatic conditions, dietetic factors, and clothing differences.

[As the degrees of difference in the whole series are so variable, it is unfortunate that the figures were not statistically tested to determine their significance.]

M. E. Delafield.

i. Burnie (R. M.). **Observations on Tropical Ulcer.**—*West African Med. Jl.* Lagos. 1931. Apr. Vol. 4. No. 4. pp. 77–86. With 2 folding charts. [80 refs.]

ii. Smith (E. C.) & Elmes (B. G. T.). **Experimental Tropical Ulcer.**—*Ibid.* pp. 87–91. With 8 figs. on 2 plates. [6 refs.] [Med. Research Inst., Lagos.]

iii. Braithwaite (E. C.). **Ulcers.**—*Ibid.* pp. 93–94.

i. At least 95 per cent. of ulcers of the skin met with in Kano, Northern Nigeria, are of the type described as ulcus tropicum. The

author summarizes the literature, chiefly from the epidemiological standpoint, and adds observations of his own. He gives charts of the ulcer percentage of total new attendances per month at Kano hospital and similarly for labourers on railway construction ; both show a big rise in October-November. Contrary to the opinion of many writers he finds that these ulcers flourish in the dry sandy districts of Northern Nigeria as luxuriantly as in damp swampy regions. It is exceptional to meet with them in any but the poorer classes. Of 649 ulcers treated in 1927, 95·5 per cent. were on the leg below the knee. Predisposing factors are discussed under the headings, trauma, debility, diet deficiency. Smears made from an unselected series of 133 untreated ulcers after swabbing gave spirochaetes and fusiform bacilli 107, fus. alone 7, spir. alone 2, neither 17 ; all of the last class had received treatment. Other fairly constant findings were a gram-positive coccus and a diphtheroid bacillus. All attempts to obtain pure cultures of the spirochaetes and fusiforms have failed.

Fourteen experiments of transmission performed on man are described. It is deduced from them that fusiform bacilli are the chief factors in imparting to the ulcers their virulent characters and that probably other organisms play a part both by virtue of their toxic principles and by stimulating the activities of the fusiform bacilli. Of the various treatments recommended it is probable that any may be followed by rapid healing, for equally good results are obtained by cleansing of sloughs and simple water or saline dressings. In early cases an ointment of bismuth nitrate, iodoform and vaselin [? Bipp] has been found most useful ; in cases where destruction of tissue has occurred surgical measures are required. Though the author realizes that prevention of injury would reduce the incidence he questions whether native labourers could be induced to wear protective coverings for the legs, and suggests a weekly or bi-weekly inspection for the early stages. The two main essentials for production of ulcer are—injury to the skin and some condition which lowers resistance.

ii. The authors at Lagos inoculated 20 *Macacus rhesus* and obtained positive results in 12, but in only one was a well-marked ulcer produced. They consider these monkeys unsuitable. They then made 12 experimental inoculations in natives, obtaining positive results in 6. The inoculation, which was autogenous in 4, was made intracutaneously with a hypodermic syringe. The results are tabulated. It is concluded that tropical ulcer can be produced in suitable subjects in this way, that in the lesions fusiform bacilli at first predominate, later spirochaetes, that N.A.B. administration did not stop the formation of the ulcer in two cases, that bacilli of the pseudomonas group were recovered from all the experimental lesions but one. In one experiment spirochaetes and fusiforms were present in abundance up to 21 days. Experiments were also made with cultures. Neither spirochaetes nor fusiforms could be obtained free from contamination. Two types of mixed cultures were available : (1) aerobic cultures containing numerous spirochaetes, scanty fusiforms and pseudomonas ; (2) anaerobic cultures containing numerous fusiforms, elongate organisms and pseudomonas. Three positive results were obtained with spirochaete cultures. With the anaerobic cultures there was no evidence of mutation of fusiforms into spirochaetes. The authors stress the inconclusiveness of the experiments.

iii. A description by a surgeon of the treatment of tropical ulcer. Briefly, it consists in curetting, cauterizing, and suitably dressing till

healthy granulations are formed, when Thiersch grafts are applied. For the details, which are obviously important, the paper must be consulted. A good method with children or after elephantiasis is the implantation method whereby grafts the size of a pin's head are thrust into the granulations.

A. G. B.

VERBUNT (J. A.). Het ulcus phagedaenicum tropicum. [**Phagedaenic Tropical Ulcer.**]—*Nederl. Tijdschr. v. Geneesk.* 1931. Nov. 7. Vol. 75. No. 45. pp. 5461–5471. With 1 plate.

In this clinical lecture the author goes in some detail into the symptomatology, diagnosis and treatment of tropical phagedaena or ulcer. He deals with a case of a solitary, painless, oval ulcer, situated over the ankle and having an overhanging, raised, undermined indurated edge and a base which was partly granulating, partly covered with yellowish green, gangrenous, necrotic membrane. A stained smear made with material from under the overhanging margin showed numberous leucocytes many of them badly staining, numerous organisms especially cocci, bundles of spirochaetes larger than the *Spirochaeta pallida* some finely and some loosely spiral, and fusiform bacilli. The combination of spirochaetes and fusiform bacilli is especially characteristic. In the diagnosis of such ulcers syphilis and yaws have to be excluded and these affections may be present in addition. If the ulcer heals under treatment in 4 to 6 weeks it may be taken to be simple tropical ulcer. The treatment consists in the use of iodoform or bleaching powder, potassium permanganate solution or salicylic acid ointment. The surrounding skin may require to be protected during treatment with a zinc oxide paste.

W. F. Harvey.

INNES (Flora R.). **Notes on the Diagnosis and Treatment of Ulcus Tropicum.**—*Indian Med. Gaz.* 1931. Aug. Vol. 66. No. 8. pp. 430–431. [Med. School, Vellore, S. India.]

For many years the author has treated tropical ulcer with a thick dusting of quinine sulphate for the first dressing and of cinchona powder subsequently. This treatment appears to be welcomed by the people of Vellore, South India.

"The method is this: Make a solution of sodium bicarbonate in cold water, roughly two drachms to a pint. Soak cotton-wool in it and simply apply it to the ulcer, after a few minutes remove it and the glairy discharge will adhere to it; repeat this three to five times until the clean rough red base appears. Dust on quinine or cinchona powder thickly and dress. Give the patient a week's supply of sodium bicarbonate and of cinchona (of the latter 5 to 10 grains for each daily dressing is usually sufficient) and instructions to carry out the same method at home, being careful to remove the remains of the previous day's cinchona. Next week the patient returns with the ulcer often level with the skin and the report of no pain and good sleep from the first night. The dressing is repeated and another supply of sodium bicarbonate and cinchona given. The method has the additional advantages of being efficacious, cheap and of requiring no special skill. We have passed on the method to village teachers and workers. In road-side work we frequently use cinchona as a prophylactic dressing for fresh wounds as so many of them develop ulcus tropicum later."

A. G. B.

Hoffmann (J. M.). De geschiedenis van gele koorts en dengue in Europa. **[The History of Yellow Fever and Dengue in Europe.]**—*Nederl. Tijdschr. v. Geneesk.* 1931. Oct. 31. 75th Year. No. 44. pp. 5384–5390. [23 refs.] [Inst. of Trop. Hyg., Amsterdam.]

As the mosquito *Aedes aegypti* is prevalent in parts of Europe up to 44° N. latitude, the possibility of the epidemic occurrence there of yellow fever and dengue is a matter of importance. Yellow fever has repeatedly visited Europe since the first epidemic in Guadeloupe in 1635. Spain and Portugal have suffered most. The appearance of dengue in Europe goes back to the end of the 18th century. It, however, has ravaged both the east and west of Europe. In Greece the development of epidemic dengue is traced to the opening of the Suez Canal. The epidemics in Athens of 1927 and 1928 are well known. In the first of these about 20,000 people were affected. Really great epidemics can only develop in the countries where the insect vector is abundant, and may only come to an end with the advent of the cold weather. Not only so, but it is to the transportation of the infected mosquito rather than the human case that great epidemics of yellow fever and dengue are due. The patient is no longer infective for mosquitoes after the third day and as the incubation period of these two diseases is a matter of 5 to 12 days, fumigation of a ship from an infected port, which has been more than 15 days on the journey, is sufficient if no fresh cases have occurred. It is otherwise, of course, if cases have occurred on the journey. With the development of air-travel, however, the subject of quarantine of individuals arriving from infected countries becomes one of considerable importance. Research with yellow fever virus should not be undertaken in places where *Aedes aegypti* is prevalent and yellow fever is not endemic.

W. F. Harvey.

Ross (Ronald). **A Mathematical Justification of Mosquito-Control.**—*Jl. Trop. Med. & Hyg.* 1931. July 1. Vol. 34. No. 13. pp. 177–183. With 3 diagrams in text. [1 ref.]

It is not possible to make satisfactory experiments on the influx, efflux, and varying density of mosquitoes without a mathematical analysis. The subject is really a part of the mathematical theory of migration. There must be for every living unit a certain distance which that unit may possibly cover if it continues to move all its life, with such capacity for movement as Nature has given it, always in the same direction. This distance is the limit of migration and scarcely one in many billions of living units is ever likely to reach it, not because the units do not possess the capacity for covering the distance, but because the laws of chance ordain that they shall scarcely ever continue to move always in the same direction. Owing to the constant changes of direction which must take place in all random migration the large majority of units must tend to remain in or near the neighbourhood where they were born. Thus though they may really possess the power to wander much further away, right up to the ideal limit, yet actually they generally find themselves confined by the impalpable but no less impassable walls of chance within a much more circumscribed area. Mathematical analysis also shows that as a general rule the number of immigrants into any area of operations must for practical purposes be very small or inappreciable a short distance within the boundary

line. The statement, frequently made, that local anti-propagation measures must always be useless owing to immigration from outside, is untrue.

[This is a reprint of a paper entitled the Logical Basis of the Sanitary Policy of Mosquito Reduction read at the Section of Preventive Medicine of the International Congress of Arts and Science, St. Louis, in 1904, and published in the *British Medical Journal*, May 13th, 1905. The author republishes it as he believes fallacious experimental demonstrations of the possibility or impossibility of mosquito-control are still being made, and few workers of the present generation seem to have heard of this early study of the problem.]

A. B. Hill.

Stearn (Allen E.) & Stearn (Esther Wagner). **Chemotherapeutic Equilibria.**—*Jl. Experim. Med.* 1930. Feb. 1. Vol. 51. No. 2. pp. 341–356. [23 refs.] [Division of Physical Chemistry & Dept. of Preventive Med., Univ. of Missouri, Columbia.]

In spite of the important discoveries which have been made in the department of chemotherapy it is true that so far general principles are lacking which might guide in the search for further effective chemotherapeutic agents. Thus the authors commence by quoting a statement that "the real difficulty lies in the necessarily opportunistic experimental method, and the lack of a rational scientific means of approach." They claim that "the considerations presented in the present paper are sufficiently general to be valid regardless of the mechanism of chemotherapeutic action which may be eventually discovered" and "it is hoped that they will suggest a tentative rational approach to such a study." There then follows a discussion of certain physico-chemical phenomena connected with antiseptic dyes, which have been investigated by the authors and others with special reference to their bearing on problems of chemotherapy. The following are the chief points examined. (1) The effect of hydrogen-ion concentration on the staining of bacteria by a dye such as gentian violet and on the bactericidal action which it produces; the parallel behaviour is emphasized in these two effects, e.g., in the case of a basic dye increased alkalinity (pH) intensifies both. (2) The concentration of the dye which is attainable in the blood with safety to the animal; it is estimated that for gentian violet, this is sufficient to permit of effective antiseptic action being exerted. (3) The rate of absorption of dye (gentian violet) by protein (gelatin) till equilibrium is attained; this is rapid, and the same is presumably the case with bacteria; hence the organisms rapidly fix the dye and the latter will immediately begin to exert its bacteriostatic influence and to affect the vitality of the bacteria, even although they may not be quickly sterilized. (4) The formation of colourless derivatives of the dye (gentian violet), which readily occurs in the blood; these are not devoid of antiseptic properties, hence disappearance of the stain does not necessarily imply cessation of antiseptic action. (5) The parallel existing between factors which favour bactericidal action and staining on the one hand, and those which cause flocculation of protein or agglutination of bacteria on the other. (6) A comparison of the electrical conductivity of a mixture of protein (gelatin) and gentian violet with that of a mixture containing, instead of the dye, another base such as nicotine or potassium chloride; the results show that only in the first case is the conductivity less than

the calculated value ; the dye therefore appears to form an un-ionized compound with the protein—it is thought that specificity in antiseptic action may be related to this property.

[The aim of such enquiry being to formulate generalizations, the views of the authors are of interest, although they are expressed in a terminology which tends rather to confuse than to enlighten the biological reader. It must be emphasized, however, that the mass of observed facts can scarcely be classified satisfactorily in this broad fashion at present. For instance, the authors state that " the presence of protein or other matter of a similar nature which chemically resembles bacteria should decrease the effectiveness of any agent by binding a portion of it in an ineffective combination " and the action of serum on antiseptics may be mentioned in this respect. While this is true of gentian violet, the remarkable fact is that it is not the case with such antiseptics as optoquine or acriflavine. Again, the fact that the ratio of the antiseptic power of gentian violet for staphylococcus and *B. cloi* differs so markedly from that of brilliant green for the same two organisms, does not seem to fit in with a simple scheme.]

C. H. Browning.

Kroó (H.) & v. Jancsó (N.). Die Bedeutung des Reticuloendothels für die Immunität und Chemotherapie. (Der chemotherapeutische Abheilungsvorgang.) [**Significance of R.E. in Immunity and Chemotherapy.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1931. May 22. Vol. 112. No. 3. pp. 544–558. With 4 text figs. [30 refs.] [Robert Koch Inst., Berlin.]

Seeking for some method of eliminating the R.E. system other than blockade with large doses of highly concentrated colloidal solutions or suspensions, the authors used an " electrocolloidal " copper solution intravenously. The resulting damage to the R.E. system could be demonstrated morphologically and functionally. One to four hours after injection of 0·075–0·1 cc. into the mouse, the Kupffer cells were already necrotic ; liver cells, leucocytes and lymphocytes were unaffected. 0·025 cc. sufficed to diminish the activity of the Kupffer cells towards a subsequent dose of colloidal gold and 0·1 cc. to arrest it completely within 15 minutes.

Splenectomized mice treated with this solution failed wholly or partly to develop agglutinins and haemolysins, or an active immunity to pneumococci. Using splenectomized and normal mice infected with trypanosomes or spirochaetes, they studied the effect of chemotherapeutic substances in doses insufficient to bring about immediate cure. In animals receiving the copper solution they obtained the following results. Arsenophenylglycin, atoxyl, etc., acted as in the normal animal. Arsacetin, neosalvarsan, etc., which acted in the splenectomized as in the normal animal, showed after copper an enhanced curative effect. With salvarsan, etc., the curative effect was diminished. Evidently the process of cure is a double phenomenon. The chemotherapeutic agent causes the sudden disappearance of parasites from the blood-stream and acts independently of the R.E. ; development of immunity following very quickly on the destruction of parasites completes the cure and does not take place with abrogation of the functions of the R.E.

E. Weston Hurst.

Emanuels (B. J.). Vergelijkend, speciaal bij tropentemperaturen verricht, onderzoek naar de waarde van de nieuwe serumreactie voor de syphilisdiagnostiek, "Meinicke's klärungsreaktion auf Syphilis" (M.K.R.), ten opzichte van de reacties van Wassermann, Sachs-Georgi en Vernes. [**Comparative Research, Especially under Tropical Temperature Conditions, on Serotests for Syphilis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Sept. 15. Vol. 71. No. 12. pp. 1026–1035. [19 refs.] [Inst. for Trop. Med., Leiden.]

The tropical temperatures had no influence on the reactions. 750 specimens were tested comparatively, 627 with all the four tests mentioned. Of the latter 285 gave negative results in the whole series. The test was positive with M.K.R. in 326 cases, with Sachs Georgi in 186, with Wassermann in 166 and with Vernes in 154 cases. Out of 122 cases in which only the M.K.R. yielded a positive result, in 79 the patient was clinically suffering from syphilis (mostly primary, tertiary and latent stages).

W. J. Bais.

Orenstein (A. J.). **Vaccine Prophylaxis in Pneumonia. A Review of Fourteen Years' Experience with Inoculation of Native Mine Workers on the Witwatersrand against Pneumonia.**—*Jl. Med. Assoc. South Africa.* 1931. June 13. Vol. 5. No. 11. pp. 339–346. With 3 diagrams. [10 refs.] [Summary appears also in *Bulletin of Hygiene.*]

This paper is a careful study of the results of prophylactic inoculation against pneumonia. Pneumonia has been the chief cause of morbidity and mortality among the native mine workers since the establishment of the gold mining industry on the Witwatersrand. An account is given of the attempts at immunization against pneumonia among the workers. It is maintained that the experiments performed on the natives prior to the introduction of wholesale immunization of all workers have not been conclusive and only one experiment known as Experiment No. 3 appeared to justify the adoption of prophylactic inoculation. This experiment was started on the Witwatersrand in July, 1914. Of 55,900 natives of various tribes, one half were inoculated and the other half left as controls. Lister's "typed" vaccine was used, containing five specific "types" with a total content of 2,000 million organisms per dose. One inoculation was given. The inoculated natives gave a case rate of 16·4 per 1,000 and the uninoculated 20·6 per 1,000. As a result inoculation of all natives was made practically compulsory throughout the mines. There was a gradual rise in the pneumonia death rate between 1920–1928 indicating that prophylactic vaccination had no high protective value. In 1929 inoculation was discontinued on certain mines and the experience of these was compared with those on which inoculation was continued. Mines on which inoculation was continued had a higher attack rate in 1930 than in 1928 while mines on which inoculation was stopped had both a lower attack rate and a lower death rate as compared with the rates for 1928.

In a paper by Ordman [*Bull. of Hyg.* 1931, Vol. 6, p. 552] it was held that the inefficacy of the vaccine used was due to a radical change in the bacterial flora in pneumonia. In this paper the contention that the clinical type of pneumonia has radically changed is examined. The author does not agree with Ordman's findings either

with regard to the change in the clinical type of pneumonia or that prophylactic inoculation diminished the attack rate in the early period of the natives' service on the mines.

H. M. Woods.

KIRSCHNER (L.). De sero-bacteriologie der croupeuze pneumonie in Nederlandsch-Indië. [**The Sero-Bacteriology of Lobar Pneumonia in the Dutch East Indies.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. Sept. 1. Vol. 71. No. 11. pp. 990–1012. [65 refs.] [Pasteur Inst., Bandoeng.]

Lobar pneumonia is one of the most important infectious diseases in the D.E.I. In controllable communities (soldiers) its frequency and the mortality it causes surpass those of enteric and bacillary dysentery. Bacteriological and serological examination of specimens obtained from 105 patients showed that about two-thirds of the cases were caused by pneumococcus Type I and II, the others by Type IV. In a few fever patients, not suffering from pneumonia, Type III was found. In contacts only Type IV was detected. There exists a pronounced parallelism between the virulence of the organism for men and mice. Though generally speaking Type I and II give rise to more serious cases than does Type IV, yet within each of the groups strains of various virulence are found. The estimation of the virulence in mice is more important than the type testing. The author recommends cultivation from the heart blood of the mouse immediately after death. Type specificity is shown by mixing equal parts of a fresh broth culture of the strain with specific serum. An immediate precipitation is followed subsequently by agglutination. Therapeutical experiments with immune serum yielded negative results. The concentrated FELTON serum is of no use after the third day of the disease. Some results obtained with prophylactic vaccination in coolies of a mining company appear encouraging but do not allow of any definite conclusions.

W. J. Bais.

KOWALZIG (Hans). Erfahrungen bei der Behandlung der Lungenentzündungen der Neger im Hochland von Angola. [**Treatment of Lung Inflammations of Negroes in the Highlands of Angola.**]—*Deut. Med. Woch.* 1931. June 26. Vol. 57. No. 26. pp. 1109–1110. [3 refs.]

Treatment by solvochin and transpulmin. No details.

A. G. B.

BONNE (C.), KOUWENAAR (W.), MÜLLER (H.) & VOS (J. J. Th.). De levercirrhose in Nederlandsch-Indië. [**Cirrhosis of the Liver in the Dutch Indies.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1931. June 1. Vol. 71. No. 6. pp. 506–617. With 18 figs. on 9 plates. [14 refs.]

This elaborate report, the reading of which may be strongly recommended to those interested, is the result of the collaboration of four anatomo-pathologists in the Dutch East Indies in regard to a subject studied by the International Committee on Geographical Pathology. It deals with a total number of 12,957 postmortems, of which those showing cirrhotic alterations of the liver, either as the immediate cause

of death or as a casual finding, are taken into consideration. These cases are presented in tabular form at the end of the report (58 pp.).

The various types of cirrhosis of the liver described in the literature are reviewed. The authors cannot in their material find argument for the recognition of special types of cirrhosis, known as *fatty cirrhosis, pigment cirrhosis, cirrhosis following acute yellow atrophy, tubercular cirrhosis.* Single cases were seen of *Wilson's disease, cardial cirrhosis, juvenile cirrhosis* and *biliary cirrhosis*, which cases are briefly described. *Zoöparasitic cirrhosis* (in clonorchiasis and schistosomiasis) was seen in a few cases. It may be deducted from the material in that, like the causal infestations giving rise to this type of cirrhosis, it does not occur endemically.

The main part of the report deals with *Laennec's cirrhosis* and *syphilitic cirrhosis*, both frequently met with.

By varied grouping of their material the authors invariably arrive at the conclusion that Laennec's cirrhosis is considerably more frequent in Java and Sumatra than it is in most other countries. This increased frequency especially concerns Javanese men, but also Chinese men and less Javanese women. Possible causes for the high frequency of liver cirrhosis are considered. No proof exists of the etiological influence of the natives' spiced food. The stomach, which in the first place might be damaged by such factors, is rarely affected by disease in the Malay. Nor may diseases of the bowel or intestinal fermentation be considered with any probability as the causes. The consumption of alcohol by the races under consideration is certainly very low. The possible influence of malaria (SITSEN) is not proved, but deserves further investigation, either to support or to reject this hypothesis. The alleged high copper content of the cirrhotic liver (MALLORY, ASKANAZY) was not regularly found. Thus the actual causes of the prevalence of the disease remain obscure.

The frequency of primary cancer of the liver, nearly always of the hepatocellular type, is emphasized. It practically always occurs in cirrhotic livers.

Syphilitic cirrhosis (or better syphilis of the liver, because often no actual cirrhosis exists, but rather perihepatitis and strands of connective tissue altering the liver into a " hepar lobatum ") was frequently met with, more in Chinese, who suffer more from syphilis in general, than in Malays. In rare cases it was the immediate cause of death.

The illustrations represent beautifully the various types of affection under consideration.

W. J. Bais.

BUTTIAUX (R.) & SÉVIN (A.). Sur l'étiologie des colites ulcéreuses (étude clinique et expérimentale). [**Etiology of Ulcerative Colitis.**] —*Ann. Inst. Pasteur.* 1931. Aug. Vol. 47. No. 2. pp. 173–219. With 6 text figs. [26 refs.] [Pasteur Inst., & St.-Sauveur Hosp., Lille.]

Colitis, which constitutes the most frequent affection of the large intestine, may be at one time trivial and transient, at others extremely grave. The form here considered is ulcerative, chronic and usually haemorrhagic. Sigmoidoscopy and radioscopy are the two most powerful aids to diagnosis and the latter should always be employed to obtain an idea of the localization and importance of the lesions. The majority of modern workers recognize that the cause of ulcerative colitis is an

infective agent. Some like BARGEN attribute all forms to the same pathogenic agent; others recognize a multitude of microbes.

The difficulty of this subject is greatly increased, as the authors have shown by their researches during more than five years, by the fact that the pathogenic microbes can rarely be isolated from the faeces, but have to be removed from the bottom of the ulcers. The employment of rectoscopy or sigmoidoscopy has greatly facilitated this technique of direct isolation from the mucous membrane. On this basis all forms of colitis are discussed with the exception of toxic colitis due to mercurial poisoning.

The following conditions are distinguished :—

(*a*) Ulcerative colitis due to dysentery bacilli; certain cases of chronic bacillary dysentery are described.

(*b*) Ulcerative colitis due to the Salmonella group. In 132 cases of severe colitis they isolated Morgan's bacillus 12 times. In one case the symptoms had persisted for five years, and the patient's serum agglutinated the organism in a strength of 1 : 200.

(*c*) Ulcerative colitis due to the gonococcus is also recognized.

(*d*) Ulcerative colitis due to organisms which normally exist in the intestine. These are, the streptococcus, the staphylococcus, *Bact. coli*, and the pneumococcus. Anaerobic organisms such as the *B. perfringens* can also become pathogenic.

(*e*) Ulcerative colitis due to the diplo-streptococcus of Bargen. After a period of scepticism the authors recognize the important rôle played by this organism in ulcerative colitis.

(*f*) Finally, they recognize as distinctive a form of haemorrhagic colitis caused by a diplococcus isolated by themselves. This diplococcus they consider has distinctive cultural characteristics and is agglutinated by the patient's serum in a dilution of 1 : 100. They have succeeded in producing a specific agglutinating serum by repeated subcutaneous injections of the microbe, a titre of 1 : 5,000 being obtained.

The paper closes with a short account of other forms of colitis, including amoebic dysentery and giardiasis, and experimental work on the inoculation of rabbits with strains of the organisms mentioned above. [A great deal of this experimental work is not very convincing.]

P. H. Manson-Bahr.

BOUFFARD. La pneumococcie chez les noirs.—*Ann. de Méd. et de Pharm. Colon.* 1931. Apr.–May–June. Vol. 29. No. 2. pp. 229–235.

CANY (G.). Les applications tropicales des eaux arsenicales de la Bourboule.—*Rev. Prat. Malad. des Pays Chauds.* 1931. May. 10th Year. Vol. 11. No. 5. pp. 231–233.

ESTAS & SAMBON (M.). Note préliminaire sur le traitement de la pneumonie de l'indigène par la diathermie.—*Bull. Méd. du Katanga.* 1931. Vol. 8. No. 2. pp. 38–39.

LEGER (Marcel), VASSAL (Pierre) & FAUCONNIER (Jean). Modifications du chimisme sanguin sous l'influence de la cure hydro-minérale d'Encausses-les-Thermes.—*Bull. Soc. Path. Exot.* 1931. Mar. 11. Vol. 24. No. 3. pp. 222–229. [8 refs.]

DE MELLO (Froilano). O fomento das Novas Conquistas e suas relações com os problemas de assistência e saneamento. Memória apresentada ao 3.° Congresso Colonial Nacional reunido em Lisbôa em 1930.—*Arquivos da Escola Méd.-Cirurg. de Nova Goa.* Ser. A. 1931. No. 6. pp. 805–813.

NOCHT (B.). Chemotherapy in Tropical Diseases.—*Malayan Med. Jl.* 1931. June. Vol. 6. No. 2. pp. 38–42.

REVIEWS AND NOTICES.

CARTER (Henry Rose) [M.D., Assistant Surgeon-General (retired) U.S. Public Health Service]. **Yellow Fever. An Epidemiological and Historical Study of its Place of Origin.** Edited by Laura Armistead CARTER and Wade Hampton FROST.—pp. xii + 308. With 5 figs. (3 maps). 1931. Baltimore: The Williams & Wilkins Company. [26s. 6d.]

The history of yellow fever has attracted the attention of many historians, culminating in the encyclopedic work of BÉRENGER-FERAUD published in 1890. During the last forty years, however, such far-reaching changes have occurred in our knowledge of this and other diseases that it is very desirable that the accounts of earlier epidemics should be re-examined in the light of new facts in the epidemiology of yellow fever.

The author, after retiring from the United States Public Health Service, devoted the last three years of his life, up to 1925, to the preparation of an account of the early history of yellow fever. This account has been prepared for publication by L. A. CARTER and W. H. FROST, and constitutes a most interesting and valuable contribution to the literature on the subject.

The first part of the book is devoted to a general account of the epidemiology of yellow fever, including the conditions necessary for the continued existence of the disease. The possibility of its dispersion, linked up with the conditions affecting the distribution of its transmitting host *Aëdes aegypti*, is shown to depend on a variety of details among which temperature and sociological conditions seem to be the most important. The second part is concerned with diseases which have, or might have, been confused with yellow fever in the past. The most striking omission from this list is Weil's disease, which, in view of recent studies in South America, must have been one of the most common sources of confusion. It should be noted, however, that the treatise was written before the importance of this disease was realized.

The third part, comprising three-quarters of the book, contains a detailed study of the place of origin of yellow fever, including the historical evidence on this subject, dating back to the codices of ancient Mexico, and the earlier Spanish writings of the sixteenth century, which leads the author to the conclusion that the disease did not occur in America prior to the epidemic of 1648 in Yucatan.

After discussing many of the early American epidemics, the author describes some of the early records of sickness on the West African coast, and shows that many of these might well have been yellow fever. The positive evidence is not very convincing, but there are many reasons for considering this region to be the place of origin of the disease. The insect vector, *Aëdes aegypti*, has many related species in West Africa and the Old World, but none in America; therefore the biological evidence is in favour of West Africa being the original home of the yellow fever mosquito, whence it has been carried to ports and become established wherever the requisite conditions of climate and breeding places were found.

Moreover the African negro, although contracting yellow fever as readily as other races, has it more mildly and rarely dies of it, his reaction being what one would expect in a race exposed to the infection for many generations. Consequently the author is of the opinion that the available biological evidence is altogether in favour of an Old World—West African—origin of yellow fever, and this is wholly consistent with the historical evidence.

E. Hindle.

ROCKEFELLER FOUNDATION. **Annual Report 1930** [MASON (Max), President].—380 pp. With numerous illustrations. New York: 61 Broadway. [Review appears also in *Bulletin of Hygiene.*]

The report of the Rockefeller Foundation for 1930 is, like its predecessors, full of interest. Much of the work there briefly and modestly referred to has been already recorded in greater detail in various scientific periodicals and those dealing with hygiene or disease in the tropics have been summarized in the *Bulletin of Hygiene* or the *Tropical Diseases Bulletin*, but the report gives succinct accounts of the subjects and brings together again points which may have escaped the notice or slipped the memory of those who read the fuller articles on their first appearance.

Yellow fever takes a foremost place; a short description of its investigation from the historical aspect is followed by an account of what has been done in West Africa and in South America by American and British workers, mainly under the direction of Dr. BEEUWKES. Malaria research and control in Bahia and Rio Grande do Norte, Brazil, in the Peruvian Andes, the Philippines, Jamaica, Porto Rico and elsewhere are brought to notice, and the developments in hookworm control, in nutrition problems and pellagra are recorded. At the end of each section is a useful list of papers written by members of the staff or those assisting in the work in question.

Dealings with actual disease direct form, however, but a part of the Foundation's activities. The educational assistance given must lead to inestimable advantage; mention may be made of some of the benefits conferred: the establishment and maintenance of Fellowships in different countries, the interchange of professors, aid to state and local health administrations, training of health workers, assistance to schools and institutes of hygiene and public health, to schools of nursing, capital grants to established institutions. The social services benefit largely and the humanities also by grants for research and bibliographical study, in England, France, Germany, Greece and elsewhere—in short benefactions scattered with unstinting hand from a fund administered with a view to producing the greatest good to the greatest number.

H. H. S.

DUGDALE (J. N.) [M.B., Ch.B. (Edin.), etc.]. **Health in Hot Climates.** 2nd Edition.—189 pp. 1931. London: John Bale, Sons & Danielsson, Ltd., 83–91, Great Titchfield Street, W.1. [5s.]

The author states in his preface that this book "has been written for those going out to the tropics for the first time" and to serve as a first aid, with advice regarding immediate treatment. Under the former one would naturally look for information as to the effects, physiological and pathological, of tropical climates, for advice on clothing, cleanliness, prevention of chill, risks of venereal disease, etc., on the choice of site and aspect of a house, on mosquito-proofing, furniture, care of quarters and annexes, supervision of servants from a health point of view, storage and preservation of food, disposal of refuse. Many of these receive no mention at all, others are disposed of in a few lines, for example a dozen or so on the important subject of clothing: "In the warm period of the day wear light clothing and as few as circumstances may require." "A most important region to protect while sleeping is around the waist, which should be covered with a folded blanket." The first statement is not very helpful, while, as regards the second, an ordinary cholera belt is irksome enough on a hot night, a folded blanket would be intolerable. Of the mosquito net we are told to "see that it is carefully adjusted by your

servant before nightfall," no word as to shape, size of mesh, and mode of adjustment.

Much of the advice on first aid in emergencies is on the usual lines, but much extraneous matter is included, e.g., the theory of causation, the course, symptoms and treatment of dengue; the question as to whether Marcus Aurelius died of smallpox, whether leprosy and smallpox existed in ancient Egypt; the treatment of strabismus in children. In the chapter on yellow fever are statements which should not appear at the present day: "The causal organism . . . is a leptospira" is a theory disproved for some years now, and "it is now possible to be inoculated against yellow fever, and the results have been very satisfactory" has not stood the test of time. "Typhoid fever," the author states in a brief chapter treating of typhus and typhoid together, "is unfortunately still common in England," but two pages later, "cleanliness and hygiene have completely destroyed typhus, and with inoculation have almost as completely made typhoid disappear." Several other quotations might be given, but these must suffice.

The whole book gives one the idea of worked-up notes of a by-gone day, taken during a course of tropical medicine, and we see that the author is styled "Graduate of the London School of Hygiene and Tropical Medicine," although the school does **not** confer degrees.

H. H. S.

Sociedad Argentina Patologia Regional del Norte. **Sexta Reunión . . . celebrada en Salta los dias 29 y 30 de septiembre y 1 de octubre, 1930. Dedicada a conmemorar el cincuentenario del descubrimiento del párasito del paludismo por Laveran.** [Sixth Meeting of Pathological Society of Northern Argentine.]—pp. xx+880. With numerous illustrations. 1931. Buenos Aires: Imprenta de la Universidad.

The report of the Sixth Congress of the Argentine Pathological Society, held in Salta in September and October, 1930, makes an imposing volume. Professor Salvador Mazza, the President, introduces the work and Professor Franchini follows with an article on the life and work of Laveran. The bulk of the volume, nearly 900 pages, contains the various papers contributed, 73 in all. They are divided into 9 sections. The first, Mycological, includes 18 papers on Dermophytes, Monilia, Maduromycoses; the second, with 6, on Microbiology and Experimental Biology, three of them dealing with yellow fever (see this *Bulletin*, Vol. 28, p. 724); section three contains 7 papers on Malaria and Haematology, 5 by Professor Mazza, one each by Professor Mühlens and Barbieri (see this *Bulletin*, Vol. 28, p. 990); other sections are on Dermatology, including leishmaniases and syphilis, 11 papers; Entomology 5 papers, Hygiene 6, Parasitology, human and comparative, 11, Historical 4, and a miscellaneous section. It is clearly impossible to review so large a number of papers, nor is it necessary since a certain proportion of them, like many congress articles, though serving the very useful purpose of stating the position of the subject in question and summing up the researches already carried out, do not contribute any fresh knowledge; others which have been published elsewhere have already been dealt with by special abstracts in this *Bulletin*, while others, again, will be reserved for future summary. The whole is well printed; plates, photographs and microphotographs are well and clearly reproduced; the papers generally are of a high standard, and afford an excellent testimonial to the vigour of the Society and the usefulness of the work it is doing. The report is worthy of a stronger binding.

H. H. S.

Abrahams (Adolphe). **Diseases and Disorders of the Digestive Organs.**—110 pp.

Fagge (C. H.). **The Acute Abdomen.**—92 pp.

Mollison (Wm. Mayhew). **Acute Otitis Media.**—71 pp. With 9 figs.

Souttar (H. S.). **Radium and Cancer.**—64 pp. With 3 figs. & 3 diagrams. Pocket Monographs on Practical Medicine. F'cap. 8vo. 1932. London: J. Bale, Sons & Danielsson, Ltd. [2s. 6d. net each.]

These four little books are the vanguard of a number of similar volumes now in preparation. They are described as "pocket monographs on practical medicine" and vary from 64 to 110 pages. It is not stated for whom they are intended, but presumably for the general practitioner. The standing of the authors is a fair guarantee of the accuracy of the information given on the respective subjects.

A. G. B.

Sergent (Edmond) & Sergent (Etienne). **Vingt-cinq années d'étude et de prophylaxie du paludisme en Algérie.** [Twenty-Five Years of Study and Prophylaxis of Malaria in Algeria.]—326 pp. With 148 figs. [Institut Pasteur d'Algérie. (n.d., n.p.)]

Here we have, reproduced from the *Archives Institut Pasteur d'Algérie*, a complete account of the antimalarial campaigns in Algeria from 1902 to 1926, for which the authors have been largely responsible. Much of the book is easily read, for of the chapter called General Conclusions, Epidemiological and Prophylactic, over a hundred pages are pictorial with just enough text to make a connected story. This part is naturally of more interest to the layman than the expert. Both the text and the 148 figures are well indexed and both are clearly printed. All students of malaria in the field will want to possess this book.

A. G. B.

National Medical Journal of China. 1931. Aug.–Oct. Vol. 17. Nos. 4 & 5. pp. 393–686. With numerous illustrations. **Parasitology Number.**

The *National Medical Journal of China* makes its August–October issue a "Parasitology Number." This contains 22 articles on amoebiasis, trypanosomiasis, kala azar, filariasis and other helminth infestations, Anopheles, mycology. Strangely malaria is not represented. These articles will be reviewed in the appropriate section of this *Bulletin*.

A. G. B.